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TN
859
.C64
R504
no.2
Sec4 2.3
1975
v.2

2.3.4. LARGE MAMMALS

2.3.4.1. INTRODUCTION

Large mammal investigations are designed to determine seasonal distribution, relative abundance and population characteristics of mule deer, elk and feral horses in the vicinity of Tract Ca. Investigations are also being conducted to determine relative use of portions of the study area during seasonal movements of mule deer.

2.3.4.2. METHODS AND MATERIALS

2.3.4.2.1. Mule Deer

Winter Aerial Surveys

Aerial censuses of mule deer are conducted to determine their relative distributional abundance on Tract Ca and surrounding areas, employ high-wing Cessna aircraft designed to permit slow flight speeds at low levels above the ground. The plane is flown along standardized transects (flight paths) in each of the census areas (Figure 23) at as close to an air speed of 121.0 km (75 mi) per hour and an altitude of 45.7 m (150 ft) above the ground, as safety will allow. During the census flights, the flight paths, speed, and altitude of the aircraft are duplicated as much as weather conditions permit.

Weather conditions are of such a variable nature that perfect flight conditions are not possible for every flight. At times, the weather may postpone a flight or terminate a census that is in progress. The observer makes a decision if the census is to be conducted or continued after consultation with the pilot concerning the limitations on flight caused by the weather. The decision is based on considerations for safety of the observers and the effectiveness of the survey. The level of effectiveness of the survey is a judgment made by the observer based on past experience in conducting censuses. If a flight is postponed or not completed, it is conducted in its entirety when weather conditions become more favorable. Census flights are scheduled to be conducted 12 times at approximately semi-monthly intervals throughout each winter period. To coincide with periods of increased deer activity in the sample area, the flights are started as early in the morning as weather and safety permit and continue until all census areas have been surveyed.

R 100 W R 99 W

R 99 W R 98 W

9 8 7 6 5 4 3 2 1

NORTH CENSUS AREA

1 2 3 4 5 6 7 8

TRACT C-a CENSUS AREA

1 2 3 4

WEST CENSUS AREA

11 10 9 8 7 6 5 4 3 2 1

EAST CENSUS AREA

T 1 S
T 2 S

T 2 S
T 3 S

TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

LARGE MAMMAL AERIAL CENSUS

LOCATION of TRANSECTS

..... mule deer winter count

——— elk, feral horse & domestic livestock count

0 1/2 1 2 miles

NORTH

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Fort Collins, Colorado

R 100 W. R 99 W.

R 99 W. R 98 W.

9

8

7

6

5

4

3

2

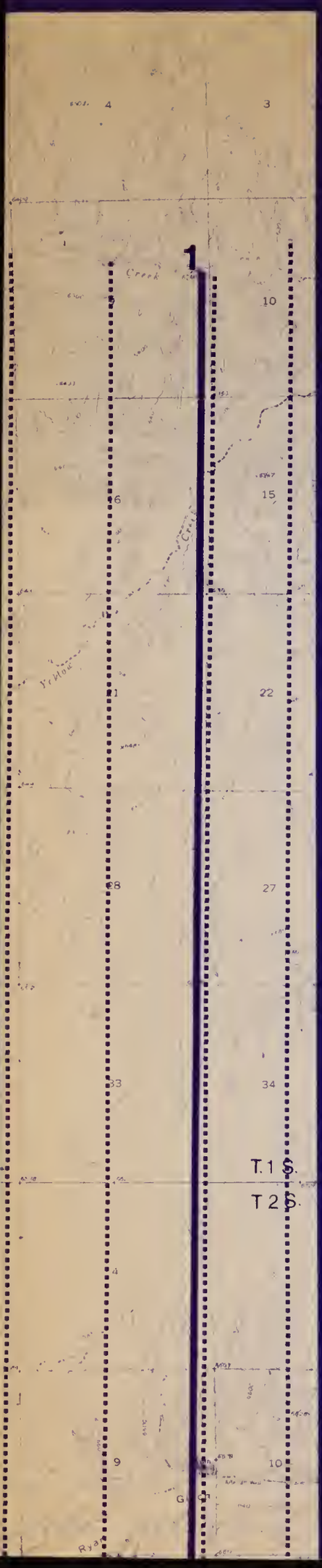
NORTH CENSUS AREA

CATHEDRAL BLUFFS

DEAD HORSE RIDGE

SAGEBRUSH HILL

96
~~102~~



TERRESTRIAL ECOLOGICAL INVESTIGATIONS

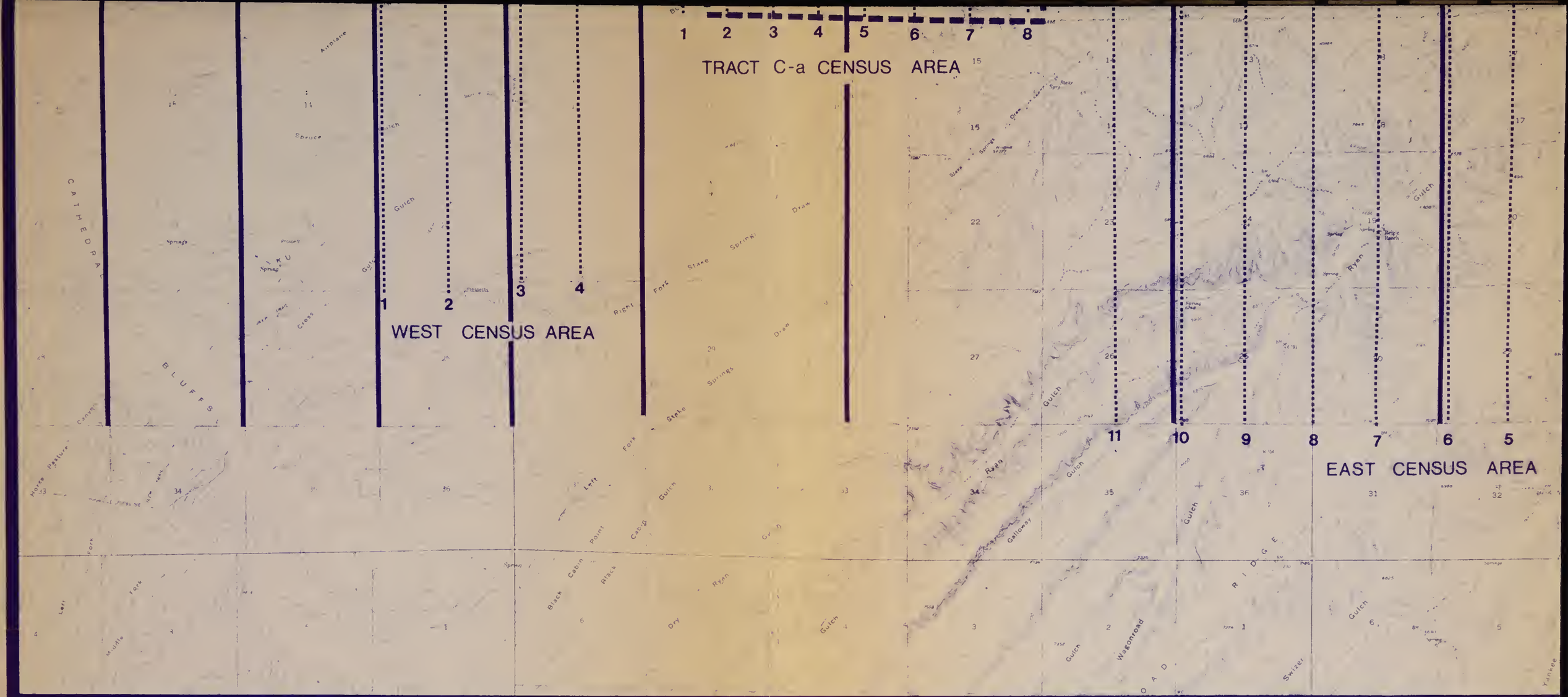
RIO BLANCO OIL SHALE PROJECT

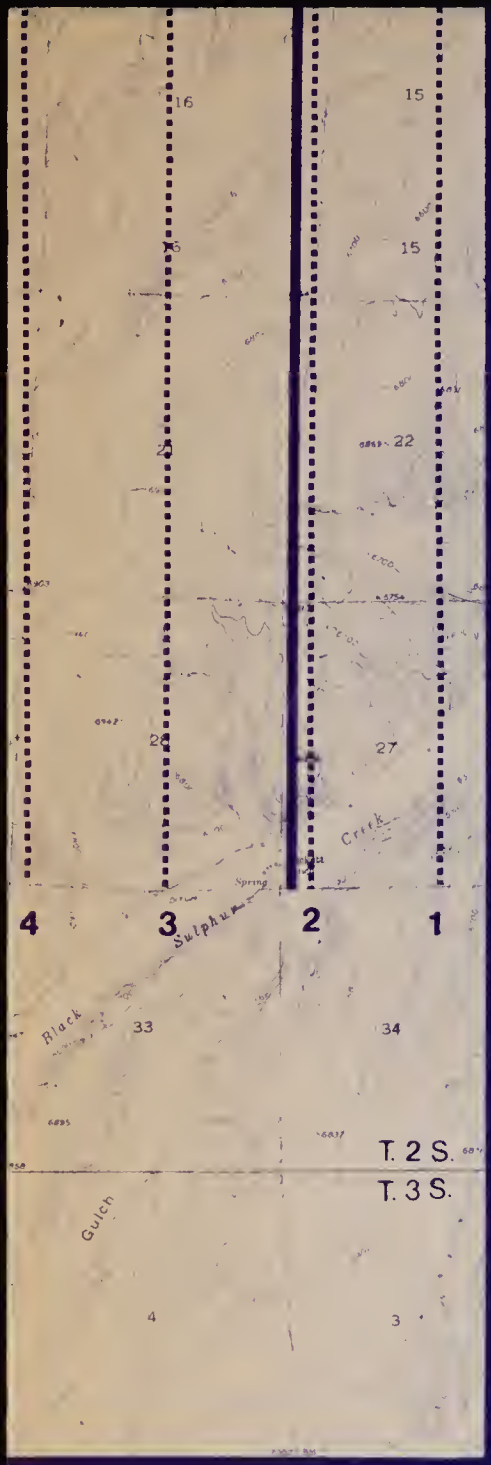
LARGE MAMMAL AERIAL CENSUS

LOCATION of TRANSECTS

..... mule deer winter count

——— elk, feral horse & domestic livestock count


1 2 3 4 5 6 7 8
TRACT C-a CENSUS AREA
1 2 3 4
WEST CENSUS AREA
11 10 9 8 7 6 5
EAST CENSUS AREA
CATHEDRAL BLUFFS
Airplane
Spruce
Gulch
Draw
Spring
Ryan
Gulch
Stake
Springs
Right Fork
Left Fork
Middle Fork
Black Cabin Point
Black Cap
Gulch
Dry Gulch
Ryan Gulch
Galloway
Gulch
Wagonroad
RIDGE
ROAD
Switzer
Gulch
Yankee
Horse Pasture
Canyon
Cross
Fence
Trail
Spring



0 1/2 1 2 miles

NORTH

ECOLOGY CONSULTANTS INC.
Fort Collins, Colorado

Figure 23. Approximate locations of big game aerial survey transects for the Rio Blanco Oil Shale Project.

To permit constant observation of the transect area along the flight paths, portable tape recorders are used to record information during the census. All animals seen by the pilot and two observers (positioned on opposite sides of the plane) are identified to species, counted, and their locations noted. The observers communicate with each other and the pilot when necessary to confirm the location of animals observed. When possible, information on age, sex, activity patterns and habitat is also recorded on the cassette tape. Immediately before the censuses commence, each observer identifies the category of data to be recorded (i.e., big game aerial census), the date, area to be surveyed, his name and observation position in the aircraft, the name and position of the other observer, name of pilot and make and model of aircraft on the tape. Weather conditions such as temperature, estimated wind speed and direction, and estimated cloud cover are also recorded. The time is recorded at the beginning of the first transect and at the end of the last transect for each census area. General impressions on animal distribution, ground cover characteristics, changing weather conditions, light and spotting conditions, and flight characteristics are recorded at appropriate times throughout the census flight. Other species of animals (such as feral horses or coyotes) observed incidentally during the mule deer winter counts are also noted to aid in the evaluation of the distribution of these species.

The information recorded on the tape is transcribed by each observer onto a standard data form (Figure 24). Distribution maps showing locations of the animals observed are generated at the same time. Incidental observations are recorded on field observation sheets (Figure 25). The procedure described above is completed as soon as possible upon completion of the census flight. If circumstances should occur which cause a delay of over 14 days or if another flight is conducted before the data are recorded on the data forms and distribution maps, the analyst will note such a delay on the forms and map.

Aerial surveys are conducted on transects within four separate but adjacent areas (Figure 23). A description of each census area is given below, in the order they are sampled during each census flight. Transects were located to efficiently cover the census areas as well as to aid orientation of the pilot and observers during the flight.

2.3.98

/Study_____ Date Flown_____ Species_____ Survey Area_____

rvers: R_____ L_____ Pilot/Aircraft_____

t _____ Finish_____ Est. ground speed & alt._____

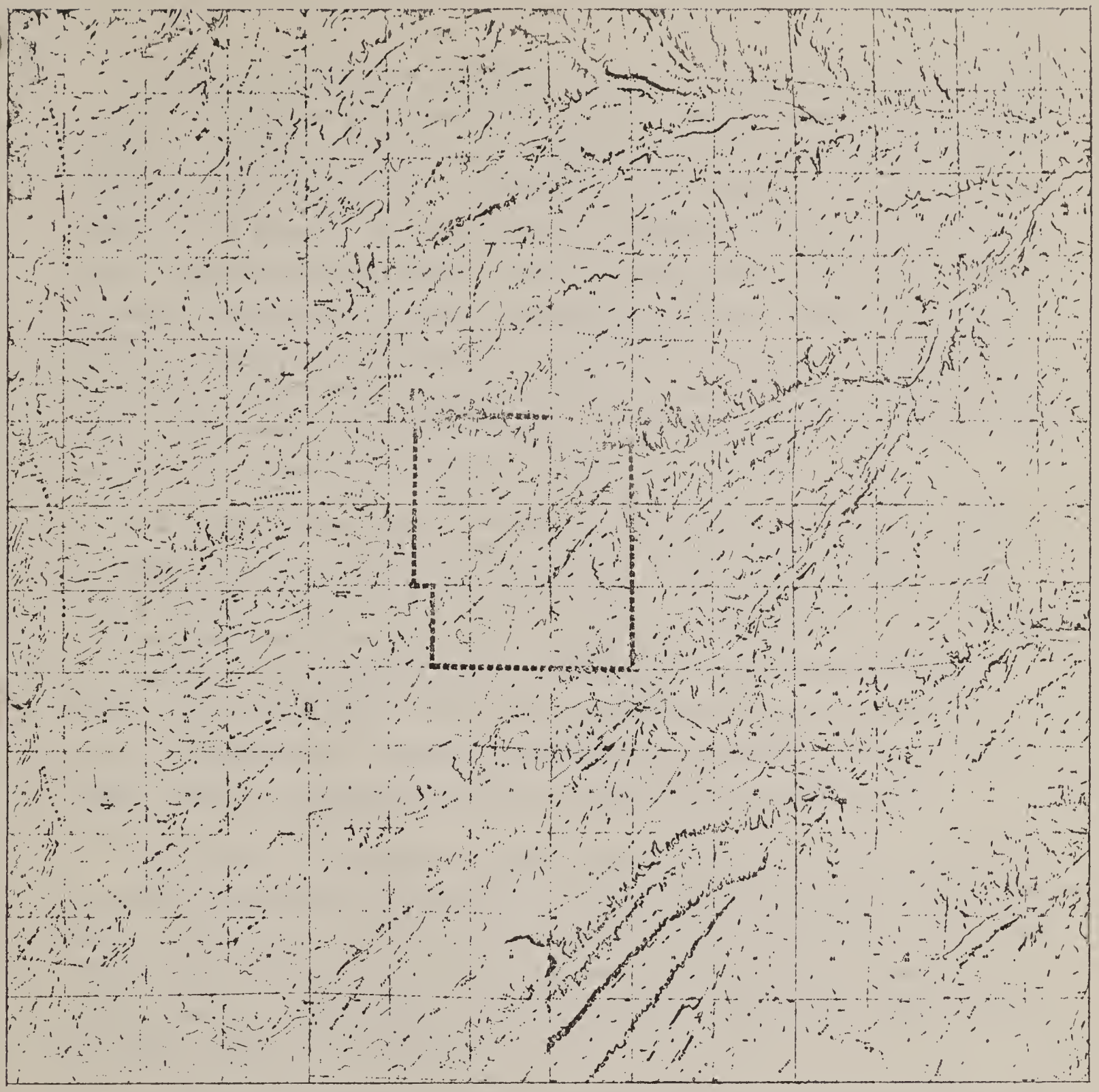
ng conditions: Ground cover_____ Light_____ Air_____

her: Temp._____ Wind_____ Cloud cover_____ Analyst_____

rvations			Location	Notes and Comments
?	.HN	U		

Figure 25. Field observation sheet for the Rio Blanco Oil Shale Proj...

FIELD OBSERVATIONS 2.3.99



Species_____ Date_____ Time_____

Means of Identification_____

Number Observed_____ ♂_____ ♀_____

Adult_____ Juv._____

Habitat_____

Other Information*_____

_____

Observer_____

* Include any distinguishing field marks for horses.

The first area sampled is Tract C-a where 8 transects are flown. The northern boundary is delineated by the ridge above Dry Fork of Corral Gulch while the eastern, southern, and western boundaries are delineated by the respective tract boundaries. The first transect commences at the northwest corner of the census area. Odd numbered transects are flown from north to south, even numbered transects are flown in the opposite direction. Each successive flight pass is flown approximately 0.53 km (0.33 mi) east of the previous transect. An area north of Tract C-a on 84 Mesa is surveyed by extensions of transects 4 through 8 northward to Duck Creek. Sampling began on this area during the February counts, after ECI became aware that 84 Mesa was being considered as a potential spent-shale disposal site.

The eastern census area is sampled by 11 north-south transects spaced at approximately 0.81 km (0.5 mi) intervals. Such spacing permits coverage of a large area to locate deer concentrations. The boundaries of the area are Duck Creek on the north, a line running south from a point approximately 0.40 km (0.25 mi) upstream from the confluence of Duck Creek and Yellow Creek on the east, Duckett Ranch on the south and the eastern boundary of Tract Ca on the west. Transect 1 commences on the northeast corner of the census area; each successive transect is west of the preceding pass.

The fourth area sampled is located west of Tract Ca. Four north-south transects, commencing on the southwest corner, successively located approximately 0.81 km east, are flown within the following boundaries: north fork of Big Duck Creek on the north, western edge of Tract Ca on the east, the road in Section 19 T2S R99W on the south and the section line 1 mile west of the Range 100W line on the west.

The eastern census area covers a much larger area than the west census area since greater numbers of deer are expected to be located within it according to Baker, 1970. The western census area, at a higher elevation than the eastern census area, has greater snow accumulations throughout the winter period. Deer are forced from this area due to deep snows.

Mule Deer Sex and Age Ratios

To provide data on the relative sex and age structure of the mule deer population occurring on Tract C-a and surrounding areas, aerial flights to determine sex and age classes are conducted during December, 1974 and 1975.

ECI is utilizing a helicopter for this work. The maneuverability characteristics of helicopters permit a more accurate determination of age and sex classes of animals than a fixed-wing aircraft. During each flight, one observer and the helicopter pilot systematically search census areas for mule deer. Age, sex and location of deer seen are recorded on cassette tapes. Other pertinent information such as date, observer's name, weather conditions, etc. are recorded the same as they are during the mule deer winter counts. These data are later transcribed on the standard data form (Figure 24) under the same constraints as described in the mule deer winter counts.

Specific techniques for designating age classes have been discussed with Mr. Richard Bartmann, Colorado Division of Wildlife, Little Hills Experiment Station. Deer observed are classified as fawns, bucks or does. The helicopter sex and age counts also aid the determination of relative distributional abundance within the study area.

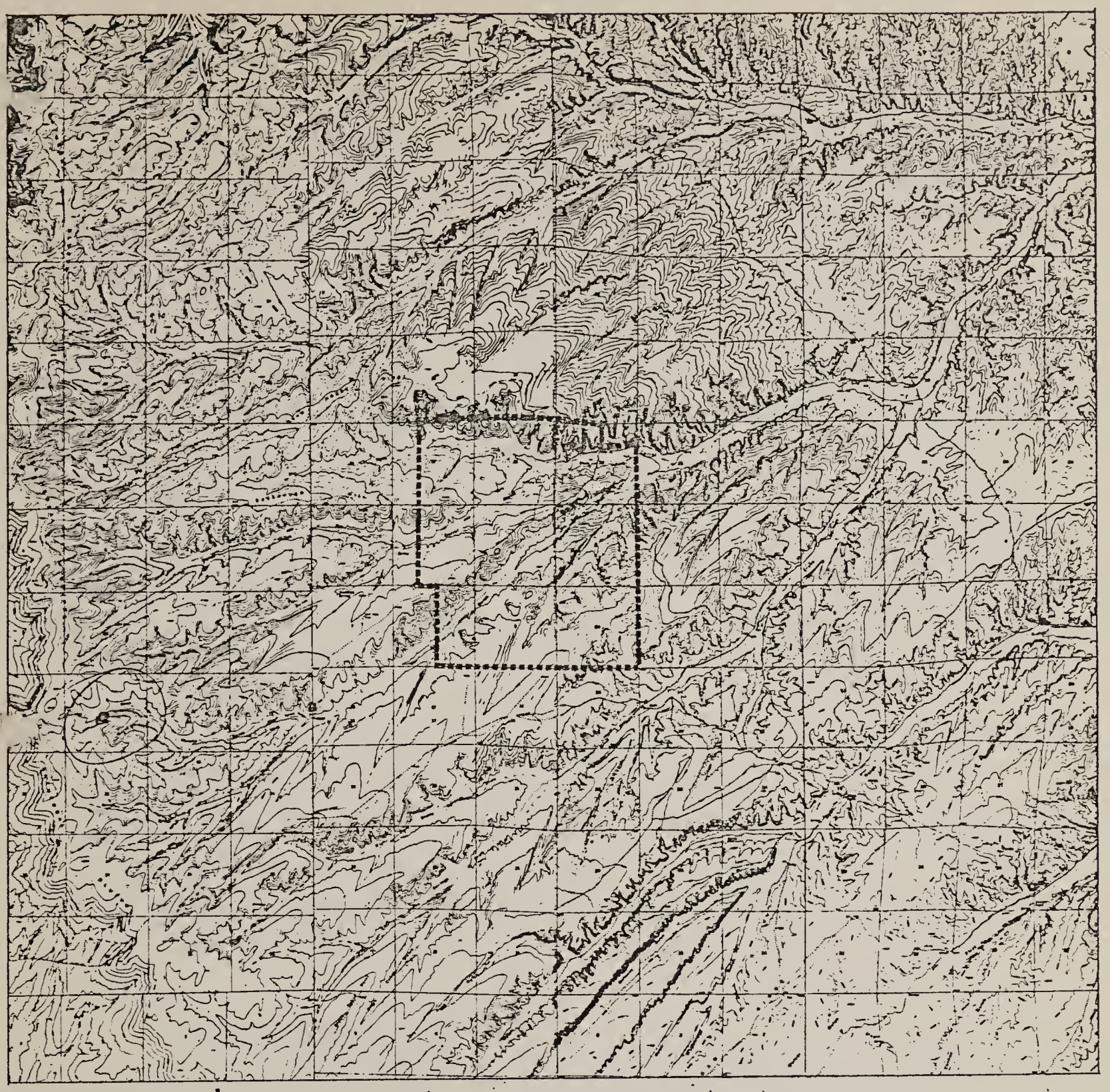
Tract C-a is completely surveyed during the sex and age ratio counts. Areas adjacent to the tract are also censused until spotting conditions or decreased deer activity within the study area preclude efficient data accumulation, in the judgment of the observers. The helicopter is flown on a zig-zag course along ridges until deer are spotted. The helicopter then hovers, gives chase or does whatever is necessary within set safety limits to count and classify the animals accurately.

Mule Deer Migration Routes

Repetitive observation during the period when migration is occurring is the technique used to determine relative levels of migratory activity in the vicinity of Tract C-a. Visual observations are made from a fixed-wing aircraft during each of the migration periods of spring 1975, fall 1975, and spring

19.1.1-24

FIELD OBSERVATIONS



Species Red Squirrel Date 12/8/74 Time —

Means of Identification tracks in snow

Number Observed — ♂ ♀

Adult Juv.

Habitat Douglas Fir

Other Information* 1 Yearling + Douglas-fir cone

Observer JB - TT

* Include any distinguishing field marks for horses.

1976. Weather permitting, seven observational flights are conducted every other day for a 2-week period during each of these times. The timing of the sequence of flights attempts to encompass the time of greatest migratory activity. This activity is quite dependent on weather conditions. Monitoring of the weather conditions, coupled with estimated times of migratory activity and coordination with biologists at Little Hills Experiment Station aid in determining the correct date on which to initiate the flights. The procedures described for mule deer winter counts are used during the flights for migration route determination with the exception that the pilot serves as the second observer in the migration route surveys.

A total of 13 north-south transects are used to survey the area during migration counts (Figure 26). The transects, spaced at 1.61 km (1 mi) intervals, are approximately 16.1 km (10 mi) to 17.7 km (11 mi) in length. The census area extends approximately 8.1 km (5 mi) east of Tract C-a boundaries (along the second flight line used during the winter counts) and to the ridge along Cathedral Bluffs west of the tract.

If certain areas appear to have substantial mule deer activity the specific areas may, at the discretion of the observer, be surveyed more intensively upon completion of the transects described above. Procedures for this more intensive survey, if desirable, are formulated by the observer based on the circumstances. Possible activities include following potential mule deer trails and/or watching a herd move through or across specific gulches.

Mule Deer Pellet Group Counts

Pellet group counts have been used by many researchers to indicate population trends, census big game, and determine distribution patterns of big game animals throughout the year or during a specific season (Bennet, English, and McCain, 1940; Riney, 1957; Julander, 1958; Harris, 1959). The technique involves counting the number of pellet groups deposited during a known time period on an area of known size. This information, coupled with a knowledge of big game defecation rates, can be used to compute the levels of deer use in an area. Several researchers have published defecation rates and other

R 100 W R 99 W

R 99 W R 98 W

T 1 S
T 2 S

T 2 S
T 3 S

13 12 11 10 9 8 7 6 5 4 3 2 1

TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

LARGE MAMMALS

..... pellet group transects

..... mule deer migration count transects

0 1/2 1 2 miles

NORTH

ECOLOGY CONSULTANTS INC.
Fort Collins, Colorado

R. 100 W. R. 99 W.

R. 99 W. R. 98 W.

CATHEDRAL BLUFFS

HORSE RIDGE

DEAD HORSE CREEK

SAGEBRUSH HILL

CATHEDRAL

1

2

3

4

5

6

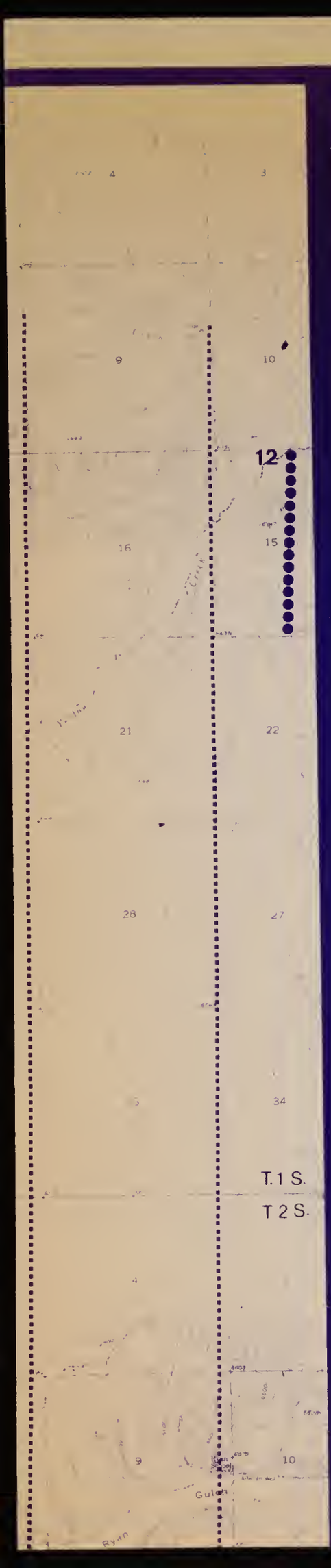
7

8

9

10

11



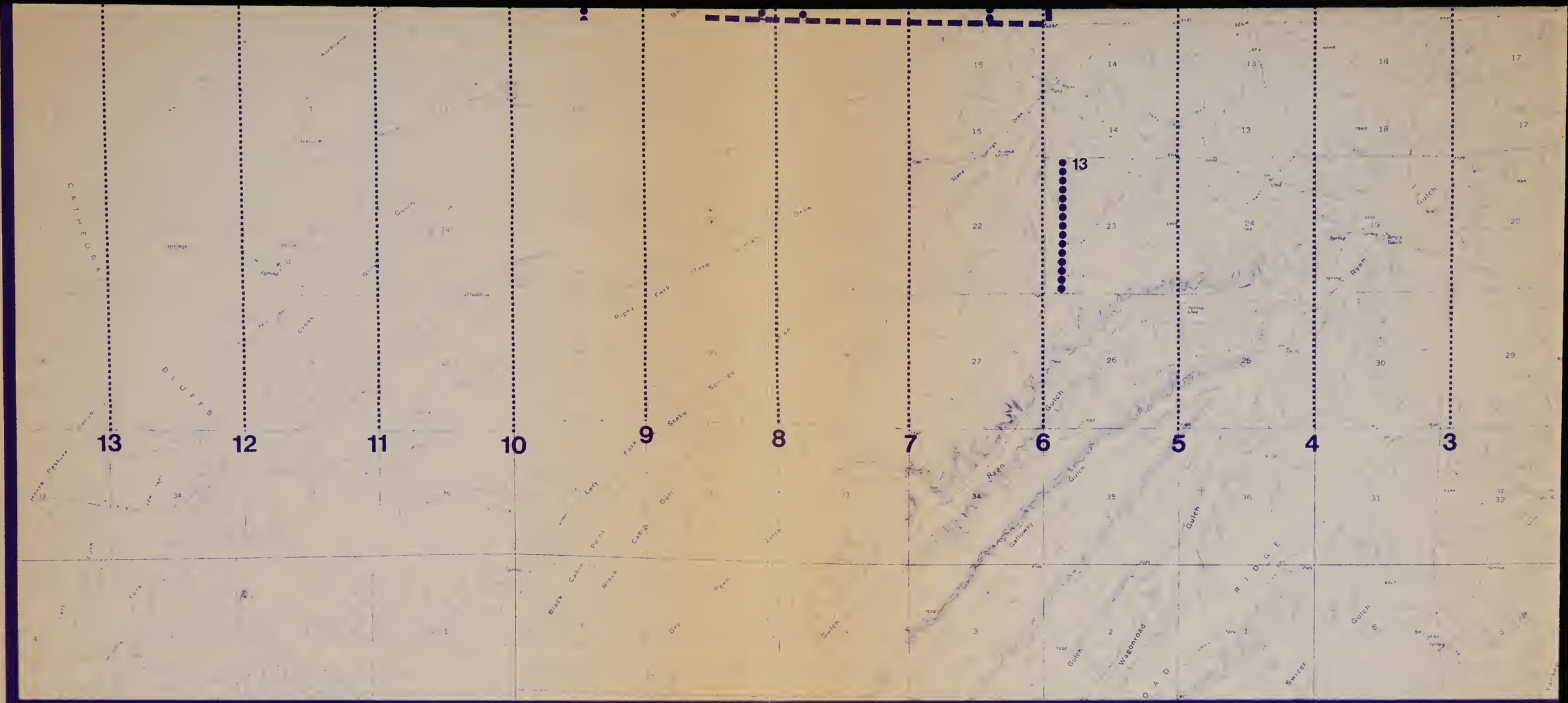
TERRESTRIAL ECOLOGICAL INVESTIGATIONS

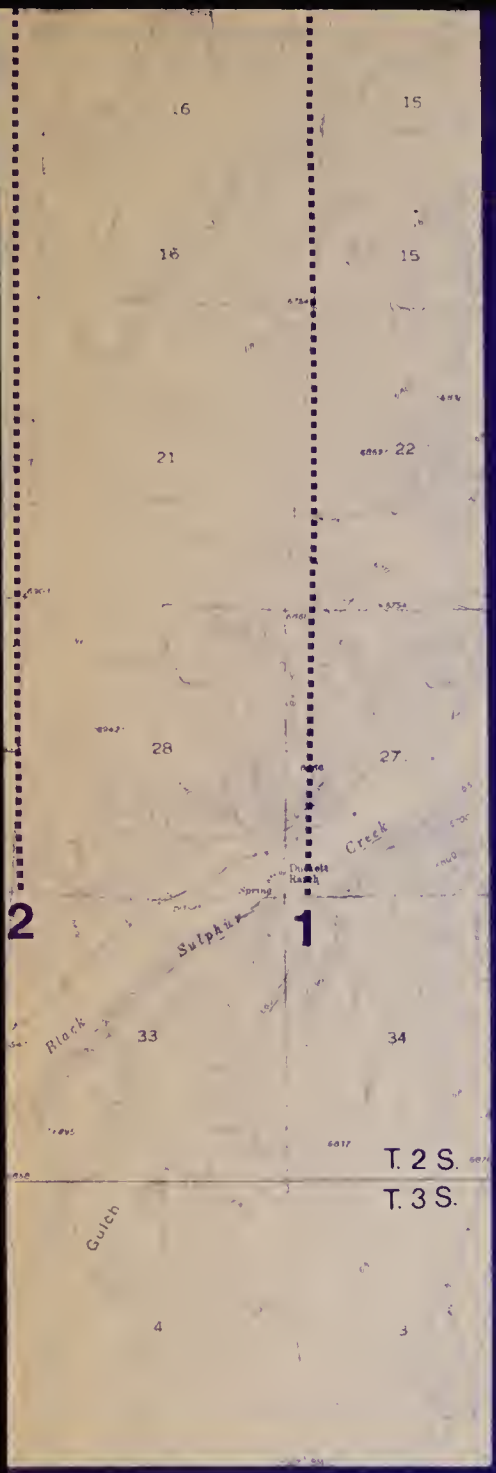
RIO BLANCO OIL SHALE PROJECT

LARGE MAMMALS

..... pellet group transects

..... mule deer migration count transects


13
12
11
10
9
8
7
6
5
4
3
13
CATHEDRAL BLUFFS
Horse Pasture
Left Fork
Middle Fork
Right Fork
Stake Springs
Black Cabin Point
Black Cabin Gulch
Dry Gulch
Ryan Gulch
Gallowey Gulch
Wagonroad
RIDGE
Swizer Gulch
Airplane
Yankee



0 1/2 1 2 miles

NORTH

ECI

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Fort Collins, Colorado

Figure 26. Approximate locations of mule deer pellet group and migration count transects for the Rio Blanco Oil Shale Project.

pertinent information on study design, techniques, and field procedures for big game studies (Rogers, Julander, and Robinette, 1958; Smith, 1964; McKean, 1965; and Neff, 1968). Sampling intensities required to produce acceptable population estimates vary according to density of pellet groups, size of area to be sampled, desired accuracy and many other factors. Most previous studies have indicated the need for a large sample size even in areas of high deer density and even where relatively broad confidence limits on the estimate are acceptable.

To provide an estimate of relative use levels of zones in the area of investigation, 13 pellet group count transects are established in the vicinity of Tract C-a. Nine transects are established on Tract C-a and four additional transects are established off tract, two in the west census area and two in the east census area (Figure 26). Statistical tests (Grieb, 1958) are run to determine adequacy of sample and sample size is increased if necessary.

Pellet plot sampling sites were randomly selected in each of the nine sections (portions of which compose Tract C-a) in the following manner. Within each section, 13 possible transects were drawn on a topographic map, oriented so they crossed the largest number of contour lines. Orientation in this manner allows sampling the largest amount of different aspects, slopes, and vegetation types. A table of random numbers was used to select the transect locations to be established from among the possibilities. The areas sampled outside of the Tract C-a boundaries were randomly selected from the east and west mule deer winter count areas in the same manner. Figure 26 depicts the approximate location of the transects established on Tract C-a as well as the location of the transects established on areas outside of Tract C-a. Transects 10 and 11 are on the west census area and transects 12 and 13 are on the east census area of the mule deer winter counts.

A map showing the transect locations was used in the field during the pellet group count transect establishment. Compasses were used to orient the transects in the proper direction and to check the transect location relative to distinctive land forms.

Each transect consists of 25, 9.3 m^2 (100 ft^2) circular plots spaced at 76.2 m (250 ft) intervals along a straight line course. During transect

establishment, a 45.7 cm (18 in) rebar stake is driven into the ground to mark the center of each plot. The distance between plots on the transect is measured with a tape measure along a compass course. An aluminum pole, slipped over the rebar stake, serves as an axis for a rope marked 1.72 m (5.64 ft) from the center of the stake. When the rope is revolved around the pole, the mark delineates the plot boundaries. A short written description of vegetation or landforms is recorded for each plot during transect establishment. If necessary, this description will be amended during later examination periods to include notes on disturbance and seasonal vegetation patterns.

All old pellets are cleared from the plots during the establishment phase. Plots are inspected visually, in two sections clockwise and once counter clockwise, to assure that all groups have been located. Each group observed is removed manually until the plot has been completely cleared of old groups. The procedure is repeated on each established plot. Clearing all old pellet groups during the initial transect work establishes a definite period of pellet group accumulation to be used in calculations.

The plots are inspected during spring 1975, when weather and ground conditions permit. Pellet groups deposited during the 1974-1975 winter period are counted, removed, and recorded on field data sheets (Figure 27). Inspections of the plots are done in the same manner as described for plot clearing procedures. To qualify for recording, a pellet group must consist of at least 5 pellets exhibiting the same general shape, color, and consistency. Groups on the edge of a plot are counted only if at least half of the pellets are within the plot boundaries. Pellet groups deposited during summer 1975 are counted and removed during September of that year. The same spring and fall examination sequence is repeated during the second year of the program.

- Mule Deer Overwinter Mortality

A color infrared technique (CIR) and ground census technique is used to estimate overwinter mule deer mortality. The CIR interpretation techniques are evaluated during the first year of the study to determine their applicability for estimating mortality in Piceance Basin habitats. The CIR technique has been described in Section 3.4.2.2.4. Procedures used for the ground truth

SINGLE TRANSECT PELLET GROUP COUNT FIELD DATA SHEET

2.3.106

Project:_____ Transect:_____ Plot Size:_____

Location:_____

Date Pellet Groups Initially Removed:_____ Survey No:_____

Plot No.	Inspector: Date: Pellet Groups Observed	Landscape and Vegetation Information
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
Total		

Figure 27. Pellet group count field data sheet for the Rio Blanco Oil Shale Project.

ECI

technique for estimating deer mortality are patterned after Colorado Division of Wildlife techniques (Gill, 1969), and are as follows: Six, 25.9 ha (64 A) transects each consisting of a belt approximately 161 m (528 ft) wide and 1.6 km (1 mi) long, are located along four of the existing on-tract and two of the off-tract pellet plot transects. The specific transects used are selected after evaluation of distribution of deer carcasses detected on the CIR imagery.

A four-man crew searches each transect by aligning themselves over half the width of the transect, spacing themselves at approximately 20 m (66 ft) intervals and walking the transect from one end to the other. The crew then moves to the second half of the transect and searches it back to the starting point. The distance between crew members is measured at the start of each half of the transect. Each carcass observed is classified as a carcass from the immediate past season or from previous winters, based on the condition of hair and bones (Gill, 1969). The carcasses are listed by vegetation type in which they occur and their positions plotted on a map for comparison with the CIR data. From each immediate past season carcass, lower jaws are collected and used for age determinations.

Jaws are inspected to determine the age of the animal at death. Several techniques are available for determining age based on dental characteristics. These include age determination by annular structure of dental cementum using incisors (Low and Cowan, 1963) or molars (Sohn, 1968), with various methods of tooth preparation, and age determination based on tooth replacement and attrition (Severinghaus, 1949; Robinette, et al., 1957). The specific method to be employed at Tract C-a is dependent upon results of interviews with Division of Wildlife personnel. The jaws are classed into the following age classes: fawn - less than 11 months, yearling - 12 to 23 months, mature - 24 to 95 months, old - 96 months and older (a suggestion from the Division of Wildlife relayed to ECI in informal comments from the mining supervisor's office on RFP's or study guidelines).

2.3.4.2.2. Elk and Feral Horses

Aerial censuses conducted at bimonthly intervals are being employed to determine the presence and distribution of elk and feral horses on the study

area. During the period when winter counts of mule deer are being conducted, some of the census flights for elk and feral horses are conducted on the same day and combined with one of the mule deer surveys. The flights on these days are conducted in the following manner: Mule deer winter counts are conducted on Tract C-a and the east census area. Coverage of the east census area also covers transects 1, 2 and 3 of the elk and feral horse counts. Transects 4 and 5 of the elk and feral horse counts are then flown prior to the west census of the mule deer winter counts. The mule deer counts on the west census area and transects 6 and 7 of the elk and feral horse counts are run concurrently by extending the appropriate transects of the mule deer count to cover the additional area of the elk and feral horse counts. By giving locations of the animals observed on the census, the appropriate number of animals is recorded for each census area on the data summary forms and distribution maps. Transects 8 and 9 of the elk and feral horse counts are conducted upon completion of the west census mule deer counts. Flights to be conducted during the summer season when mule deer aerial counts are not made will cover the nine transects designated as Elk and Feral Horse Transects in Figure 23. Flights are scheduled for October, December, February, April, June and August for each of the 2 years of the study. Methods used to record field data are the same as those described for mule deer winter counts. For each sighting the two observers record the species spotted, their location and, when possible, age structure (young vs mature). General color characteristics are recorded for feral horse bands. Before bull elk shed their antlers each year, during late March or early April, sex classifications will be recorded.

2.3.4.3. RESULTS AND DISCUSSION

Mule deer winter counts were conducted on November 8 and 21 and December 9 and 30, 1974, and on January 14 and February 1 and 12, 1975. The mule deer sex and age ratio survey was conducted on December 27, 1974. Elk and feral horse aerial surveys were conducted on November 8 and December 30, 1974. A flight for mule deer winter counts and the elk and feral horse counts was attempted on February 27, 1974 but was postponed until March 4 due to unfavorable weather conditions. Data from that flight will be presented in the Second Quarterly Report.

2.3.4.3.1. Mule Deer

The number of mule deer observed during winter aerial surveys on the four census areas is presented in Table 16. Due to varied backgrounds, weather, and spotting conditions, not all animals within an area are observed during a census flight. Thus Table 16 does not represent the total number of animals present on the areas during the census periods. Gilbert and Grieb (1957) found that one could consistently count a certain percentage of the deer present for each set of counting conditions. They checked aerial counts with ground drive censuses and found that with poor to fair conditions, an average of 34% of the total deer were counted in aerial censuses; good snow conditions resulted in an average of 45% being counted while 49% of the deer population present was observed when snow conditions were excellent. Visibility of animals also varies with habitat type. The figures should not be used, therefore, as absolute numbers but as relative abundance data to aid in the evaluation of areas within the study area.

The following discussion is based on observations during the aerial censuses conducted during the period of November 8, 1974 through February 12, 1975. The discussion is brief because surveys for the whole winter period have not been completed and a detailed discussion at this time may produce conclusions which would not be warranted after the remaining censuses have been conducted.

The number of mule deer observed was relatively low in November, climbed rapidly, and reached a peak in December, and then declined in January and February. This trend is probably biased, by better spotting conditions in December, resulting in the recording of a larger percentage of the deer present. The mule deer concentration areas also changed during the period of observation. Animals were generally scattered throughout all of the census areas during the first three censuses. Many animals were observed on the west census area on December 30, 1974 relative to the number observed on Tract C-a or in the east census area. One hundred and seven mule deer were observed north of the west census area during elk and feral horse counts on

Table 16 Mule deer observed on 4 census areas during 7 census periods for Rio Blanco Oil Shale Project [1/]

Date of Census	Census Area				
	Tract C-a	East	West	North of Tract [2/]	Total Observed
November 8, 1974	14	7	12	-	33
November 21	0	1	2	-	3
December 9	12	103	64	-	179
December 30	60	105	130	-	295
January 14, 1975	33	62	16	-	111
February 1	24	95	2	4	125
February 12	30	75	0	14	119
TOTALS	173	448	226	18	865

[1/] The figures represent only those animals observed within the census area boundaries.

[2/] Census commenced on census area north of tract on February 1, 1975

that same day. During the January and February counts, relatively more animals were observed on the east census area than on the west census area and the number observed on tract declined from that observed on December 30. Figure 28 shows the area where 56% of the total deer were observed during the February 1, 1975 census. Most of the other deer observed that day were scattered along Ryan Gulch, the south slopes above Dry Fork, Corral Gulch and near Big Duck Creek north of the tract. No concentration of animals were observed in the area during the cnesuses in November. The area north of the tract on 84 Mesa has been censused starting February 1, 1975. Future censuses to be conducted in that area during the same periods as the censuses of the other three areas will aid in the evaluation of this section of 84 Mesa.

Sex and Age Ratios

The number of mule deer of each class observed during the sex and age classification conducted on December 27, 1974 is presented in Table 17. The counts were conducted on Tract C-a, on the west census area, along Stake Springs Draw, and on 84 Mesa.

The data indicate a sex ratio of 1 buck to 5.7 does and a doe-fawn ratio of 1:.92 (92 fawns per 100 does) or a herd composition of 8.3 percent bucks, 47.6 percent does and 44.1 percent fawns. Robinette (1956) reports a fawn crop in Colorado of 90% (90 fawns per 100 does) and suggests that this is high compared to some other areas in 9 western states. He also discusses the sex ratios, and states that some areas have had sex ratios as high as 1 buck to 14 does without seriously affecting the production of the herd.

The Colorado Division of Wildlife conducts age and sex classification counts throughout the area. If their data on the 1974 winter counts of the area are available, they will be compared to the count on December 27, 1975. Our sample area may have been too small and the time constraints too limited to provide an adequate survey for sex and age classifications in the area of investigation. For example, a total of 84 deer were counted using the helicopter during the sex and age counts on the areas described. Three days later, 130 deer were observed during a count from a fixed-wing aircraft, in the west census area alone. Such observations serve to point out the rapid changes in levels of deer use in the area.

R.100 W. R.99 W.

R.99 W. R.98 W.

T.1 S.
T.2 S.

T.2 S.
T.3 S.

TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

LARGE MAMMALS AERIAL CENSUS

ELK and FERAL HORSES

	1–10	MORE THAN 10
elk	■	□
horses	●	○

mule deer concentration observed during aerial survey February 1, 1975



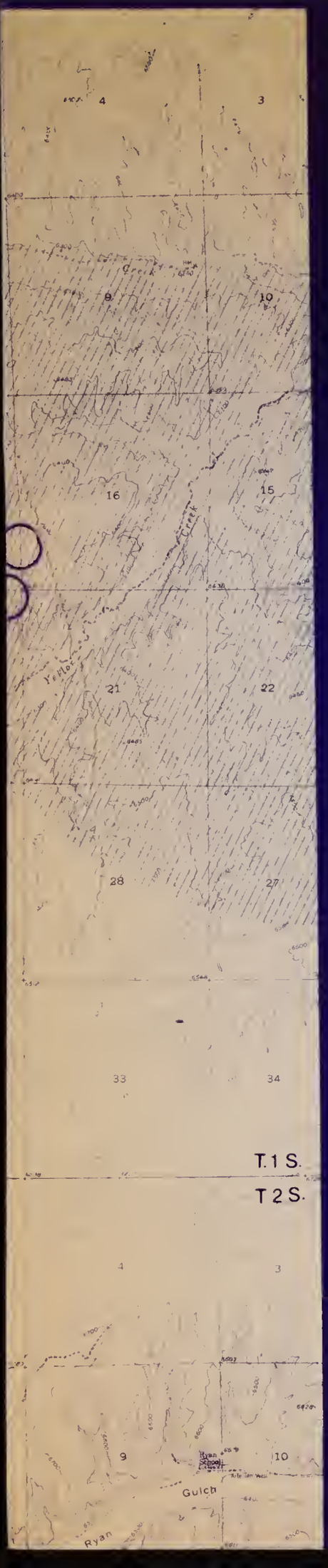
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NORTH

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Fort Collins, Colorado

R. 100 W. R. 99 W.

R. 99 W. R. 98 W.



TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

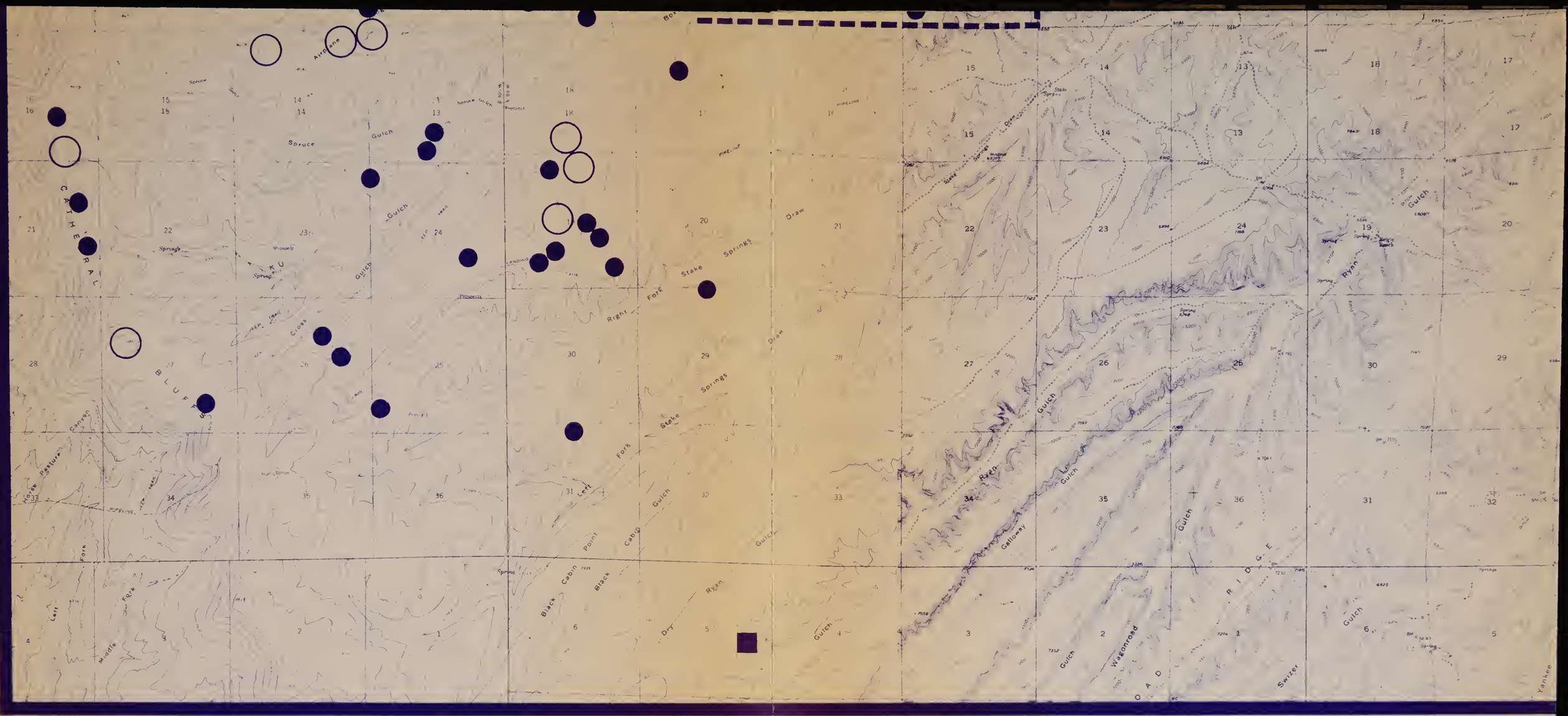
LARGE MAMMALS

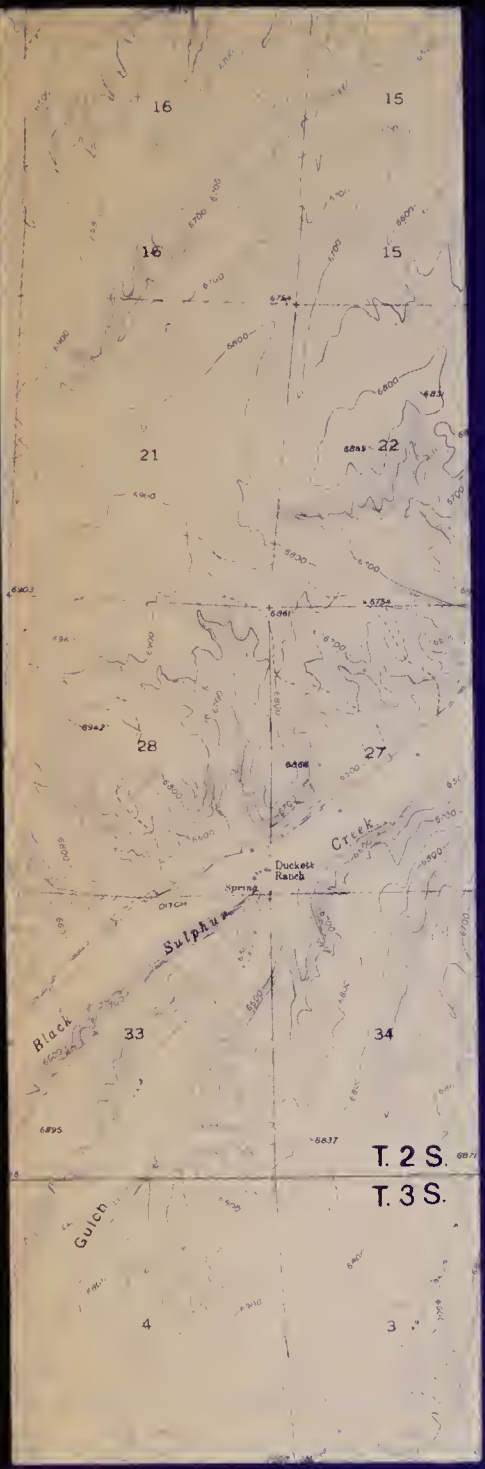
AERIAL CENSUS

ELK and FERAL HORSES

	1–10	MORE THAN 10
elk	■	□
horses	●	○

mule deer concentration observed during aerial survey February 1, 1975


Spruce Gulch
Spruce Gulch
Airplane
Box
Prospect
Prospects
Cross
Right Fork Stake Springs
Stake Springs
Draw
Draw
Left Fork
Black Cabin Point
Black Cabin Gulch
Dry Ryan Gulch
Ryan Gulch
Galloway
Wagonroad
RIDGE
Swizer
Yankee
Ryan Gulch
Horse Pasture
Left Fork
Middle Fork
CATHEDRAL
BLUFFS
Airplane
Spruce
Gulch
Cross
Right Fork
Stake Springs
Draw
Left Fork
Black Cabin Point
Black Cabin Gulch
Dry Ryan Gulch
Ryan Gulch
Galloway
Wagonroad
RIDGE
Swizer
Yankee
Ryan Gulch
Horse Pasture
Left Fork
Middle Fork
CATHEDRAL
BLUFFS



0 1/2 1 2 miles

NORTH

ECOLOGY CONSULTANTS INC.
Fort Collins, Colorado

Figure 28. Location of elk and feral horses observed on aerial surveys conducted between November 8, 1974 and February 12, 1975 and mule deer concentration area observed on February 1, 1975 for the Rio Blanco Oil Shale Project.

Table 17. Mule deer sex and age ratios for the Rio Blanco Oil Shale Project, December 27, 1974

Class	Number Observed
Bucks	7
Does	40
Fawns	37
TOTAL	84

2.3.4.3.2. Elk and Feral Horses

The number of elk and feral horses observed during the two surveys are presented in Table 18. A large proportion of the observations of feral horses and the only aerial observations of elk have occurred during raptor and mule deer winter count aerial surveys. Approximate locations of the elk and feral horse observations on all aerial surveys conducted from November 8, 1974 through February 12, 1975 are presented in Figure 28.

The horses observed during the winter appear to prefer windblown ridges on the higher elevations of the study area. More horses have been observed on the west census areas during mule deer winter counts. A herd has also been frequently observed on 84 Mesa.

The ridges along the Cathedral Bluffs are where 20 of the 23 elk have been observed during other aerial surveys. The other three elk were observed along Ryan Gulch approximately 2.4 km (1.5 mi) southwest of the mouth of Dry Ryan Gulch. The observations made by field personnel involved in ground work near the bluffs coupled with the aerial census observations indicate that a small elk herd may reside in that area west of the tract.

2.3.4.4. SUMMARY AND CONCLUSIONS

The following summary and conclusion section is based on limited data and should be considered as preliminary interpretations subject to modification when a more complete survey has been completed.

Human activity associated with the preparation of the DDP for Tract Ca may have an effect on wildlife; however, this type of data is presently unavailable.

Mule Deer Winter Aerial Surveys

Mule deer winter counts seem to indicate a movement of animals from the western census area toward the east as winter progresses. Snow, which hinders

Table 18. Number of elk and feral horses observed during aerial censuses for the Rio Blanco Oil Shale Project, November 8 and December 30, 1974

Date	Elk	Feral Horses
November 8, 1974	0	108
December 30, 1974	0	86

movement and restricts forage availability, has a strong influence on the deer (Loveless, 1967; Gilbert, Wallmo and Gill, 1970). Animals move from the areas of deep snow to more favorable sites. Deer appear to concentrate on the eastern one-half of the east census area relative to the other census areas. The rough areas near the confluences of Yellow Creek and Duck Creek including the northeastern portion of 84 Mesa appeared to have the highest concentrations of deer in the east census area during the most recent winter counts. This area lies within the limits of the upper boundary of the average winter range discussed in Baker (1970).

Mule Deer Sex and Age Ratios

The mule deer sex and age class count indicated a herd composition of 8.3% bucks, 47.6% does, and 44.1% fawns for the day the survey was conducted. To obtain more accurate estimates of mule deer sex ratios within the area, more extensive surveys would be required. However, mule deer sex ratio information specific to the Piceance Basin, may be obtainable from the Colorado Division of Wildlife.

Elk and Feral Horse

Elk and feral horse investigations to date suggest that a small herd of elk lives in the habitats west of the tract while feral horses are more numerous and widespread in the study area. Horses have been observed occupying the same general areas west of Tract C-a throughout the duration of this first segment of the study.

III. LARGE MAMMALS

Census Area and File Number

A. Mule Deer Census
   Tract C-a (6.1.3.1.1)
   West of Tract (6.1.3.1.2)
   East of Tract (6.1.3.1.3)
   North of Tract (6.1.3.1.4)
   Mule Deer Sex and Age Ratios (6.2.3.1)
B. Elk and Feral Horses
   Elk (6.6.3.1.1)
C. Feral Horses (6.6.3.1.2)
D. Distribution Records (14.1.2)

Tract C-a (6.1.3.1.1)

.../Study P3,164 Date Flown 11/06/74 Species Mule deer Survey Area Trail Creek

Observers: R(F) Craig & Kling L(B) Dennis Northcross Pilot/Aircraft Lear Piper / Cessna Skylane 182

Start 0649 Finish 0725 Est. ground speed & alt. 75-80 @ 200' above ground

Counting conditions: Ground cover poor little snow-no snow Light poor Air fair-good

Weather: Temp. 30°/32° Wind calm/calm Cloud cover variable 100%/70% Analyst CLK

Observations				Location	Notes and Comments
♂	♀	JUV	U		
			2	Transect 4 very east end in Corral Gulch	unidentified as to age & sex
	1			Transect 4 westerly edge of transect Corral Gulch	sagebrush type
	1	2		Transect 6 ridge between Corral & Boulder ~ ½ mile from end (west)	sagebrush type standing
	2			Transect 6 small gulch at west end	sagebrush snowbrush type. they were running
	1	1		Transect 7 southern-west part of Boulder Gulch	in sagebrush doe standing fawn running
				Transect 3 3 doe just past burning clutch on E. side	in Juniper-juniper
	1			Transect 6. in SE ¼ of SE ¼ of Sec 5 T 9S R 9W	Running in pinion/juniper - sage

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.3.11.-2

oj/Study 83/04 Date Flown 11/21/74 Species Mule deer Survey Area Trout C-a

servers: R(F) Craig Kling L(B) Dennis Vonborn Pilot/Aircraft Leo Faur / Cessna Cardinal 177

art 0851 Finish 0917 Est. ground speed & alt. 175°C 75-80 mph

ing conditions: Ground cover poor Light good Air good

ather: Temp. 48F/43°F Wind 3-4 West Cloud cover NONE Analyst CLK

servations				Location	Notes and Comments
	♀	JUV	U		
				No animals spotted by CLK.	

otal Animals Counted: NONE

imal Distribution:

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

j/Study 83/04 Date Flown 12/9/74 Species Mule Deer Survey Area Tract C-a

ervers: R(rear) Dennis Vanthorn F(rear) Craig Kling Pilot/Aircraft Lee Faust / Cessna 206 4

rt 0842 Finish 0907 Est. ground speed & alt. 80 mph @ 175'

ing conditions: Ground cover Fair Light Fair Air good

ther: Temp. 15°/ Wind calm Cloud cover NONE Analyst Craig L Kling + Dennis VanHorn

Observations ♀	JUV	U	Location	Notes and Comments
1			Transect 4 just above corral gulch	Pinyon-juniper sage interface, standing
1	2		Transect 8 just above Boxelder Gulch	Pinyon-juniper type - running 2-3" snow in the area.
			DVH observations	
1	3		Transect 2 just so. of box Elder	running in sage
1			Tran. 5 Ridge top past Corral gulch	mixed p-j/sage standing
2	1		Tran 8 sec 3 NE¼ of SE¼	running thru p-j

l Animals Counted: 12

al Distribution: scattered

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BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

Proj/Study 83/04 Date Flown 12/30/74 Species Mule Deer Survey Area Tract C-a

Observers: R front CX Kling L rear D. VanHorn Pilot/Aircraft Len Paur / Cessna 182 Skylane

Start 08:33 Finish 0900 Est. ground speed & alt. 80 mph @ 175' above ground

Viewing conditions: Ground cover Excellent Light Excellent/good Air Good

Weather: Temp. 12°/ Wind ~5 SW Cloud cover variable. Analyst DUH and CLIC

Observations ♀	JUV	U	Location	Notes and Comments
		4	#1 bottom of Dry Fork	standing in sage type
4	1		#2 north facing Slope Corral Gulch	Bedded in serviceberry
		25	#6 near southern end Flat	were in sage but scattered and ran into
			area on top	P.J.
	1		#6 bottom of Boxelder	
		5	#7 North Facing exposure Corral Gulch	3 bedded others run P.J. North facing
	1	2	#8 ~1/2 mi from Confluence of	Northern exposure P.J. type
			Corral + Boxelder Gulches.	
			DVH	
7	4		T.1 at beginning of transect	standing in sage - P.J.
5	2		T.1 at end of transect	grazing in sage
2			T.2 beginning of transect	in sage
1			T.4 N/slope of Box Elder	standing in P.J.
		7	T.8 N. facing slope of Corral	in pinyon-juniper

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

.6.1.211.-5

:oj/Study 83/04 Date Flown 1/14/75 Species Mule deer Survey Area Tract C-a

)servers: R front Kling L rear VanHorn Pilot/Aircraft Len Pauu / Cessna 206

:art 0903 Finish 0926 Est. ground speed & alt. 80 mph @ 175' above ground.

:ing conditions: Ground cover excellent -100% Light good - excellent Air good

:athe.. Temp. 29°/ 43° Wind None in Morky Cloud cover High Analyst DVH + CLK

Observations ♀	JUV	U	Location	Notes and Comments
		10	Transect 1 South of Corral Gulch	northern exposure sagebrush
		5	#5 near end of transect	bottom of gulch sagebrush
				many cracks N of Tract C-a and south of Tract C-a observed on curves on transects
			DVH	
7	1		T.1 start of transect	Scattered shrub + P-J
1	2		T.2 south of Box elder	Sagebrush
1			T.5 North of Dry fork	P-J
3	2		T.6 N. of Corral Gulch	South slope, P-J
1			T.8 S. of Corral Gulch	P-J
5	15			

tal Animals Counted: 33

imal Distribution: in groups throughout the area.

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.3.11-6

Proj/Study 83/04 Date Flown 1 Feb 75 Species Mule Deer Survey Area Tract C-a

Observers: R(F) C Kliay L(R) D Vanthorn Pilot/Aircraft Les Pann / Cessna 206

Start 0846 Finish 0926 Est. ground speed & alt. 80 mph @ 175' above ground.

Survey conditions: Ground cover Excellent new snow Light Good. Air fair

Weather: Temp. 23° Wind 10 from S-W Cloud cover 30% Analyst D.H.+ Cox

Observations ♂	♀	JUV	U	Location	Notes and Comments
			3	#5 just north of (confluence) Corral Gulch	P.J. south slope.
			7	#5 between Corral and Boxelder Gulches	cross top of ridge P.J.
			1	#6 Boxelder Gulch	south of road sagebrush type
			5	#1 start of Transect	P.J. bedded down
			3	#2 start of Transect	P.J. south slope
	3	2		#3 start of Transect	P.J.
			19		

Total Animals Counted: 24

General Distribution: several groups on S facing slope of Corral Gulch.

1 of 2 transects on late afternoon raptor survey

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West of Tract (6.1.3.1.2)

/Study 83/04 Date Flown 11/08/74 Species Mule Deer Survey Area West of Tract

ervers: R(F) Craig L Kling L(R) Dean Kenthorn Pilot/Aircraft Lee Paum / Cessna Skylane 182

rt 0648 Finish 0914 Est. ground speed & alt. 75-80 mph @ 200' above ground

nting conditions: Ground cover good-some hazy / poor elsewhere Light Fair Air Fair-good

Temp. 35° Wind slight SW Cloud cover fair-poor Analyst Craig L Kling

Observations ♀	JUV	U	Location	Notes and Comments
2			just off northern boundary of transect T1S R100W ff 1 sec 23	secondary - browsing. not on Transect area.
7			TRANSECT 1 ; sec ~~16~~ 14 T2S R100W NE ¼	STANDING in Sage & Mountain shrub
5			TRANSECT 3 : sec 24 NW¼ of sec: T2S R100W	STANDING; in Sage
2	3		in observation of Cathedral ridge sec 33 SE¼SE¼ T1S R100W	STANDING in snow w/ very small + light ground cover

Animals Counted: 20 13 off Transect 1 to North)

al Distribution: scattered

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM 6.1.2.1.2-2

oj/Study 83-04 Date Flown 11/21/74 Species Mule Deer Survey Area West of Trout.

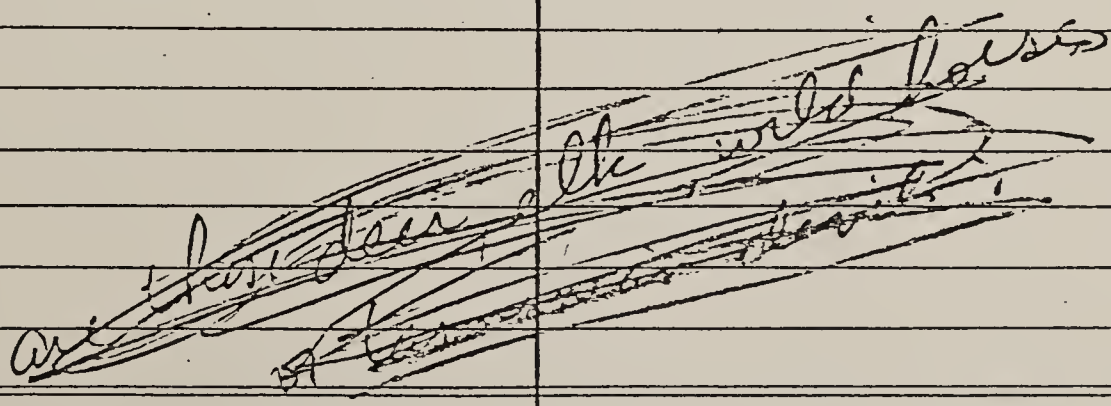
servers: R(F) Craig Kling L(R) Perris Van Horn Pilot/Aircraft Lee Paur / Cessna Cardinal 177

art 1059 Finish 1119 Est. ground speed & alt. 175' @ 75-80 mph.

u ng conditions: Ground cover poor - patchy snow no snow on south Light good Air fair

ather Temp. 47°F / 46°F Wind S - WNW - SW Cloud cover 10% high Analyst CLK

servations			Location	Notes and Comments
♀	JUV	U		
1			Transect 2 just past landing strip. South facing slope	bedded - south facing slope - no snow cover there - near dead juniper tree.
			Transect 3 ridge between Dry Fork & Corral Gulch (Water Gulch Area)	standing up - serviceberry - very little snow in that area.



al Animals Counted: 2

ral Distribution: scattered - sparse.

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM 6.1.3.1.2-3

...l/Study 83/04 Date Flown 12/7/74 Species Mule deer Survey Area West Census Area

...ervers: R(r) D VanHorn L(l) C Kling Pilot/Aircraft Les Paul / Cessna 206

...rt 1046-1102 Finish 1120 Est. ground speed & alt. 80 mph @ 175' above grad.

...ing conditions: Ground cover Fair Light fair Air good.

...ther. Temp. 25°/30° Wind _____ Cloud cover _____ Analyst DVH + CLK

Observations ♀	JUV	U	Location	Notes and Comments
			Had to orient ourselves on transect area - First attempt in wrong place.	
				Golden Eagle at end of transect / Dennis feels it may be one he saw earlier.
		16	#2 S exposure Corral Gulch	too many to age + sex some bedded others running serviceberry + sage.
		3	#2 N exposure " "	
		4	#2 " " " "	
			off north edge of transect on curve between #3 + #4	-
		11	#4 north of road crossing airplane ridge	Mtn brush - sagebrush mixture
			DVH	
1	4		#1 second ridge into transect	Sage walking
1	2		#1 3rd ridge into transect	Sage running
6	4		#3 just before Corral Gulch	Sage running
		2	#3 Top of Sagebrush Hill	Sage running
1	2		#3 just before entering Big Duck Crk.	south slope - sage mtn brush
		36		

...tal Animals Counted: 65

...imal Distribution: Clumped near Corral Gulch on both N+S exposures.

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

cj/Study 83/04 Date Flown 12/30/74 Species Mule deer Survey Area West Canada Area

servers: R(L) C. King L(R) D Vanhorn Pilot/Aircraft Hen Pann / Cessna 182 Skylane

art 1026 Finish 1148 Est. ground speed & alt. 80 mph @ 175' above Ground

ing conditions: Ground cover Excellent Light Excellent/good Air Good

ather: Temp. 15-16°F Wind slight SW Cloud cover Hi & Variable Analyst DVH + CLIC

servations			Location	Notes and Comments
♀	JUV	U		
1	2		#1 Northend of transect	
2	2	7	#2 near Dry Fork	some on slope others in bottom
		4	#2 Coral Gulch	S facing Exposure mnt brush
1	1		#2 2nd ridge N of end	N exposure bedded mnt brush type
1			#3 Boxelder	Serviceberry
		4	#3 N of Boxelder	Southern Exposure Serviceberry
2	4		#3 ridge S of Water Gulch	
		4	#3 N of Water Gulch	2 bedded 2 standing Eastern Northern exposure serviceberry
		5	#3 N of Dry Fork Coral Gulch	
		18	#3 " " " " "	one nice buck in the bunch
		8	#4 Dead Horse Ridge	
		6	#4 " " "	
		6	#4	Easterly Exposure
		4	#4	Serviceberry type
		2	#4 2nd ridge N of Transect end	easterly exposure
			DVH	
		7	T.1 Bottom of Big Duck Creek	sage - mtn Shrub
		5	T.2 N. of Water Gulch	Mtn. Shrub
7	3		T.3 South facing ridge Water G.	Sage
3	2	6	T.4 Sage brush hill	sage
3	4		T.4 in Water Gulch	bedden in Shrub
3	3		T.4 Airplane ridge	sage - rmtn
		86		

tal Animals Counted: 130

inal Distribution: North 1/3

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BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.2.1.2-5

Proj/Study 83/04 Date Flown 1/14/75 Species Mule deer Survey Area West Census Area

Observers: R. Kling L. VanHorn Pilot/Aircraft Len Paur / Cessna 206

Start 1104 Finish 1123 Est. ground speed & alt. 80 mph @ 175' above ground.

Counting conditions: Ground cover Excellent Light good → fair. Air Fair

Weather: Temp. 37° Wind light-west Cloud cover High Analyst DVH + CLIC

Observations ♂	♀	JUV	U	Location	Notes and Comments
			8	Transect 4 Dead Horse Ridge	South Facing Slope sagebrush, mnt brush mixture.
X	X	X	X	DVH	
	2			T.3 Bottom of Dry Fork	mixed shrub & Sage
	1	1		T.4 N. of Dry Fork	Sage
	2	1		T.4 Bottom of Water Gulch	Mtn. Shrub, bedded.
	2	8			

Total Animals Counted: 16

Animal Distribution: South facing slopes in northern part of transect.

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BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.2.1.2-6

oj/Study 83/04 Date Flown 1 Feb 75 Species Mule Deer Survey Area West Canadian River

servers: R F C Kling L O VanHorn Pilot/Aircraft Lon Paun / Cessna 206

art 1100 Finish 1119 Est. ground speed & alt. 80 mph @ 175' above ground.

ing conditions: Ground cover Excellent new snow Light Good Air Fair

ather: Temp. 22° Wind 5- West Cloud cover 30% / Clear Analyst DVH + CLK

servations			Location	Notes and Comments
♀	JUV	U		
			No mule deer observed by C Kling right observer	
2			#4 end of transect	Shrubs, belly deep in snow.

al Animals Counted: 2

al Distribution: Few animals or tracks observed.

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East of Tract (6.1.3.1.3)

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM 6.1.2.1.2-1

1/Study 83/04 Date Flown 1/08/74 Species Mule Deer Survey Area East of Tract

ervers: R Craig L Kling L/R Dennis VanHorn Pilot/Aircraft Leo Paur / Cessna Skylane

rt 0732 Finish 0835 Est. ground speed & alt. 75-85 mph @ 200' above ground

ing conditions: Ground cover poor No snow Light poor Air stable good

ne: Temp. 32°/- Wind light/- Cloud cover 00%/40% Analyst CLK

Observations			Location	Notes and Comments
♀	JUV	U		
			Transect 2 just above Hallows creek on small knoll	pinyon juniper type
2			Transect 1, south of Ryan gulch in NW¼	in pinyon juniper, running
3			TRANSECT 1, SE¼ of T2S R98W of sec 16	Running through pinyon-juniper.
			TRANSECT 6, sec 12; SE¼ : R99W T2S	Running " " " .

Animals Counted: 7

al Distribution: ✓ scattered

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.3.1.3 - 2

oj/Study Proj 83/04 Date Flown 11/08/74 Species Mule Deer Survey Area Snake Springs

servers: R CLK L DVH Pilot/Aircraft Les Penn/Corral Gulch Cessna 182 Skylo

tart 0944 Finish 1001 Est. ground speed & alt. 75-80 mph - @200 Ft above grou

ting conditions: Ground cover poor Light good Air Fair

ather: Temp. 34/40° F Wind calm Cloud cover 0-30% Analyst CLK

servations			Location	Notes and Comments
♀	JUV	U		

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.2.1.2-3

Proj/Study 83/04 Date Flown 11/21/74 Species Mule deer Survey Area East of tract C-a

Observers: R(F) Craig Kling L(R) Dennis Vanthorn Pilot/Aircraft Len Pauf/Cessna Cardinal 177

Start 0922 Finish 1054 Est. ground speed & alt. 125' @ 75-80 mph

Viewing conditions: Ground cover poor Light good Air Fair

Weather. Temp. 43°f/47°f Wind variable → SW Cloud cover 10% high Analyst CLK

Observations ♀	JUV	U	Location	Notes and Comments
1			Transect 9 just (south) past Carrol gulch	First animal observed today, P. mayor - jumper type appeared to be all by herself.

Total Animals Counted: 1

General Distribution: sparse - not good spotting conditions.

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BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM 6.1.2.1.2-4

oj/Study 83/04 Date Flown 12/9/74 Species Mule Deer Survey Area East canons area

servers: R(Cpt) Dennis Van Horn Ugrad) Craig L Kling Pilot/Aircraft Len Paur / Cessna 206 N

art 0915 Finish 1041 Est. ground speed & alt. 80 mph @ 175'

ing conditions: Ground cover fair to poor Light good Air excellent.

ther. Temp. 20°/25°F Wind calm Cloud cover None Analyst Craig Kling + Dennis Van Horn

Observations ♀	JUV	U	Location	Notes and Comments
			Doe + 2 Fawns Coffee to north of Transect 1	Tracks in snow more frequent than on Ca
2	2		See 20 Transect 4 just past tower	Pinyon-Juniper type
1			Transect 4 bottom of yellow Creek	sagebrush, running.
2	3		" " sec 17 n of yellow Creek	running across bottom
				Pinyon-juniper-scattered sage
1	2	1	4 deer off transect area - Transect 1 doe, 2 Fawns, 1 u	off Transect area to north.
2		11	1 ½ North of yellow Creek sec 17	T. 10 of 14
1	1		Transect 6 ~ ½ mi s of pipeline	Pinyon-Juniper Type
3	2		" " Stobe Springs Gulch	meadow
			" " just past road From 84 ranch on 84 mesa	pinyon juniper - sage habitat running less snow on 84 mesa than Weyan road ridge.
			DVH observation	
1	4 ✓		Tran. 1. - just before beginning of transect	running in P-J / sage
2			Tran 1 in sec 22 middle	sage - running
4	2		*1 in sec 34	sage - running
1	1		*1 ½ way between Ryan & Black Sul.	P-J/sage - running
			*2 ridgetop N. of Ryan gulch	Pinyon - juniper, standing
2	1		*2 just before Yellow Creek	sage, running
3	1		*3 just over ridgetop from Big Duck	pinyon - juniper running
2	1		*3 just south of Ryan gulch	pinyon - juniper running
1	1		*4 just North of Met tower	standing in sage
2			*4 500 yards past last sighting	P-J / sage standing
			*4 just No. of Yellow creek	P-J running
			*5 before entering Ryan Gulch	running from sage → P-J
12				

Animals Counted: 124

Distribution: scattered in small groups.

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

1/Study_____ Date Flown_____ Species_____ Survey Area last census area

ervers: R_____ L_____ Pilot/Aircraft_____

rt_____ Finish_____ Est. ground speed & alt._____

conditions: Ground cover_____ Light_____ Air_____

her: Temp._____ Wind_____ Cloud cover_____ Analyst_____

rvations			Location	Notes and Comments
♀	JUV	U		
1	1		#5 just before Ryan gulch on ridge top	—
3	5		#5 ½ way between Ryan & Black Sal.	sage — running
2			#10 on ridgetop past Ryan Gulch	sage
7	5		#10 bottom of Ryan Gulch	bottom land
2			#10 south ridge, south of Corral Gulch	

...DEER AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.3.1.3-6

j/Study 83/04 Date Flown 12/30/74 Species Mule Deer Survey Area East Census Area

ervers: R(F) CL Kling L (rear) D. VanHorn Pilot/Aircraft Les Pace / Cessna Skylane 82

rt 0903 Finish 1026 Est. ground speed & alt. 80 mph @ 175' above ground

ing conditions: Ground cover Excellent Light Excellent/good Air good

the.. Temp. 12-15° Wind ~5 SW Cloud cover variable Analyst DVH + CLK

ervations ♀	JUV	U	Location	Notes and Comments
		6	North of Duck Creek ~ transect 2	
			or 3 on way over to start.	
1	2		#1 drainage near beginning of transect	sagebrush.
1	2		#1 ~3/4 mi N of Ryan Gulch	Pinyon Juniper
2	2		#1 just after Ryan Gulch	1 bedded, others running sage & juniper mixed
2	3		#2 just past Duckett Ranch along road	P.J. south exposure
		9	#3 3/4 mi north of Duck Creek	
1			#3 north exposure of small gully	North slope P.J. sage
		8	#3 just off top of 84 mesa	P.J.
		6	#5 north of 84 ranch	P.J. northerly exposure
1	2		#5 south of Corral Gulch	P.J. Fairly flat-level
	1		#5 top of Wagon Road Ridge	Sagebrush.
		11	#6 small drainage N of Ryan Gulch	P.J.
		5	#7 84 Mesa above Corral Gulch	Sagebrush P.J. mixture small gully
		8	#8 small gully 1/2 mi up from Str Springs	P.J.
		4	#8 just after crossing Snake Springs	P.J.
			DVH	
2	1		T.1 on North slope of Ryan gulch	in P.J.
		10	T.2 before (south of) Ryan gulch	from sage to P.J.
		2	T.3 south of Ryan gulch	sage
2	1		T.4 " " " "	"
		2	T.4 south of Duck Creek	P-J
		8	T.5 on turn around just before 5	sage - P.J.
		2	T.5 South of Snake Springs	P.J.
		7	T.5 1/2 way between Snake Sp + Ryan	P.J.
3	2		T.5 before Ryan gulch	P.J.
2			T.5 1/2 way between Ryan & Black S.	P.J.
		90		

al Animals Counted: 128

nal Distribution: Scattered.

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.3.1.3-7

udy 83/04 Date Flown 12/30/74 Species Mule deer Survey Area East Census area

vers: R _____ L _____ Pilot/Aircraft _____

art _____ Finish _____ Est. ground speed & alt. _____

ing conditions: Ground cover _____ Light _____ Air _____

rther: Temp. _____ Wind _____ Cloud cover _____ Analyst _____

Observations			Location	Notes and Comments
♀	JUV	U		
2			T.9 south of Corral Gulch	Juniper, pinyon are bedded down
		2	T.10 bottom of Stella Spring	Sage
1			T. 11 1 mile sth. of Corral Gulch	bedded in P.J.

90

l Animals Counted:

al Distribution:

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM 6.1.2.1.3-8

roj/Study 83/001 Date Flown 1/14/75 Species Mule deer Survey Area East Census Area

bservers: R E Kleng L E VanHorn Pilot/Aircraft Len Paur / Cessna 206

tart 0929 Finish 1100 Est. ground speed & alt. 175' above ground at 80 mph

t-g conditions: Ground cover Excellent Light good Air good

eather: Temp. 37° Wind None at Marker Cloud cover High Analyst DVH CLK

Observations ♂	♀	JUV	U	Location	Notes and Comments	Sage	PJ
					tracks in rough area between Yellow +		
					Ryan Gulch.		
	1	3		Transect 1 1.5 mi N of Ryan	sagebrush knoll.	4	4
			4	# 2 very end	P.J. type	6	11
			6	Transect 3 small gully Wagon Road Ridge	Sagebrush Type	2	9
	1			# 6 middle of ridge between		7	6
				Ryan and Stake Springs		5	1
					P.J. Type.	3	4
X	X	X	X	D. VanHorn ↓		27	41
6	3			T. 1 N. of Yellow Creek	P-J. running		
1				T. 1 S. of Black Sulfur	P-J.		
2				T. 2 S. of Yellow Creek	Sage brush + foraging		
6	2			T. 2 S. of Duck Creek	P-J		
3	1			T. 2 N. of Duck Creek	P-J.		
7				T. 4 in DUCK CREEK	Sage + BOTTOM VEGETATION		
2	3			T. 7 84 Mesa	sage		
2	1			T. 7 S. of Corral Gulch	sage. 1 deer (doe) sickly!		
5	2			T. 11 S. of Corral Gulch	P-J north facing slope		
2	2			T. 11 S. of Corral Gulch	P-J south facing slope		
38	9	10					

tal Animals Counted: 68

inal Distribution: most near North east corner of census

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.3.1.3-9

roj/Study 83/04 Date Flown 1 Feb 75 Species Mule Deer Survey Area East Census Area

bservers: R F C Kling L R D. Vanthorn Pilot/Aircraft Les Paul / Cessna 206

tart 0929 Finish 1055 Est. ground speed & alt. 80 mph @ 175' above ground.

conditions: Ground cover Excellent Fresh snow Light Good Air Good

eather: Temp. 25°/28° Wind 10 SW Cloud cover 30%/Clear Analyst DVH & CLK

Observations ♀	JUV	U	Location	Notes and Comments
		5	# 2 small drainage into Yellow Creek 1½ miles South	P.J.
		8	# 3 84 mesa before Yellow Creek	Sagebrush
		4	# 3 after Yellow Creek	P.J.
		6	# 3 after Ryan Gulch - Wagon Road Ridge	P.J.
		4	#4 84 Mesa before small drainage	Sage
		17	#4 81 Mesa northing that drainage	P.J.
		7	#5 ¾ mi N of Ryan	P.J.
				1
3	2		#1 Sec 27. T. 1 S. R. 98 W.	P.J
4	2		#1 End of Transect	PJ
4	4		#3 Just So. of Yellow Gulch	PJ
		19	#4 N. Side of Yellow Gulch	PJ
4	1		#5 ½ WAY between Ryan + Black Sed.	PJ

North of Tract (6.1.3.1.4)

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.1.3.1.4.-1

Proj/Study 83/04 Date Flown 1 Feb 75 Species Mule Deer Survey Area North of Dixie-a 84 Mem

Observers: R(P) C Kling L(R) D. VanHorn Pilot/Aircraft Lea Paine / Cessna 206

Start 0946 Finish 0926 Est. ground speed & alt. 80 mph @ 175' above ground.

Viewing conditions: Ground cover Excellent now snow Light Good Air Fair

Weather: Temp. 23° Wind 10 From SW Cloud cover 30% Analyst PHH + CLK

Observations			Location	Notes and Comments
♀	JUV	U		
		4	Transect 5 north of Big Duck Creek	on slope
		4	#4 JUST South Big Duck Creek	P. J. North Slope.
		8		

Total Animals Counted: 8

Comments and Distribution: All near Big Duck creek

ECI

III. LARGE MAMMALS

B. Mule Deer Sex and Age Ratios (6.2.3.1)

Sex and Age Counts

Tract C-a, 84 mesa

oj/Study 83/65 Date Flown 12/27/74 Species Mule deer Survey Area Ridges west of Tract C-a

servers: R → Craig L Kling L ——— Pilot/Aircraft John Quarken bush/Bell Helicopter

art 0841 Finish 1130 Est. ground speed & alt. Varied according to conditions.

ving conditions: Ground cover good/Fair Light excellent/good Air good

athe Temp. 10°/15 Wind NONE/Strong SW Cloud cover High Analyst CLK

servations ♀	JUV	U	Location	Notes and Comments
			Tract C-a	Drill rigs working SE + SW corners of tract
				Few trucks in C-a at eastern edge
1			#5 south of Corral Gulch	P.J.
4	3		southern end of transect	sagebrush on top
8	8		#6 southern end of area	were in sage ran into P.J. scattered badly.
3	4		#8 south of Boxelder Gulch	
			West of Tract.	
1	1		bottom of Duck Creek	
9	8		southerly facing slope	sage - mixture of vegetation types
	6		South facing Slope above Water Gulch	Sunny Slope ½ way down slope
			slightly further down slope.	/
5	3		ridge north of Corral Gulch	south facing slope
			east of airstrip along Snake Springs Draw	under juniper tree
	-			
			84 Mesa	
3	3		west of 84 mesa road	Flat area sagebrush

. Animals Counted: 84

ıl Distribution: scattered but in groups - favored southern exposures.

ECI

III. LARGE MAMMALS

C. Elk and Feral Horses

Elk (6.6.3.1.1)

../Study 83/61 Date Flown 11/05/74 Species Elk Survey Area Trout Cr. & Surrounding Area

servers: R CLK L D VanHorn Pilot/Aircraft Les Paul

art _____ Finish _____ Est. ground speed & alt. _____

unting conditions: Ground cover _____ Light _____ Air _____

) Temp. _____ Wind _____ Cloud cover _____ Analyst _____

servations			Location	Notes and Comments
♀	JUV	U		

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM 6.6.2.1.1-2

/Study 83/61 Date Flown 12/30/74 Species ELK Survey Area Rio Blanco Study Area

:rvers: Ryal D. Van Horn L(or) C. L. Kling Pilot/Aircraft Lon Penn / Cessna Skylane 182

:t 08:33 Finish 15:35 Est. ground speed & alt. 80 mph @ 175' Above Ground

ing conditions: Ground cover Excellent Light Good Air Good

ner. Temp. 15-20° Wind light SW Cloud cover High-Low Variable Analyst DVH + CLK

rvations			Location	Notes and Comments
♀	JUV	U		
			* These Animals Observed During Raptor Surveys in the Afternoon.	
		11	North of Little Duck Creek Hillside	
		4	Ryan Gulch East Slope of small valley	
		15		

Animals Counted: 18

l Distribution: - 2 groups Jumped

ECI

Feral Horses (6.6.3.1.2)

O.O.J.1.2-1

d/Study 83/61 Date Flown 11/08/79 Species Wild Horse Survey Area Tract C-a + Surrounding Area

servers: R(F) Craig L Klein L(B) Dennis Van Horn Pilot/Aircraft Leo Pont / Cessna Skyline 182

art 0649 Finish 1001 Est. ground speed & alt. 75-80 mph @ 200' above ground

ying conditions: Ground cover poor no snow in many areas Light poor Air good

ne AFE Temp. 32°/35° Wind slight Cloud cover 100/40% Analyst CLK

Observations			Location	Notes and Comments
~~Ad~~ Juvs	JUV	U		
	3	9	Flat area above Coral Gulch sec 25 + 26 T1S R24W	1 gray the rest bay + dark a sagebrush area with a couple pinyon trees in it.
		10		
4	2			
		17	} Sec 19 T2S R99W just of landing strip Flat area	approx 4 bands but they were close together many of these horses are light white - dapple grays, sagebrush area
		15		
		5	Sec 19 T2S R99W east end of other horses near end of transect area	2 gray, others dark - in sagebrush habitat.
		13	Sec 32, T1S R99W, 800 yards past start of transect 1 in Tract C-a	all dark, in sagebrush habitat
7	4		Sec 3, T1S R99W	6 adults dark, one white. Juv. all dark in sagebrush
1	1		Sec 10 T2S R99W	adult black w/ white forhead in spot P-J. juv. charcoal
		1	Skeleton Sec 17 T1S R98W	Skeleton lying in sage
1			Section 1 T2S R99W	adult black. seen in sage - pinyon/juniper
11	5		Sec. 12 T2S R100W	in sagebrush: adult lighter brown 4 ; adult black 2; adult brown 5 ; juv. charcoal color.
		69 ~~70~~		

l Animals Counted: ~~109~~ 108 Skeleton redundantly added when column summed. CLK

al Distribution: most horses located near landing strip on ridge Sec 19 T2S R99

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.6.3.1.2-2

J/Study 83/61 Date Flown 12/30/74 Species Feral Horse Survey Area Rio Blanco Study Area

ervers: R(r) CL Kling L(eft) Lloyd VanHorn Pilot/Aircraft Len Pann / Cessna 182 Skylane

rt 0833 Finish afternoon Est. ground speed & alt. 80 mph @ 12C above ground

ing conditions: Ground cover Excellent Light Excellent/good Air Good.

ther: Temp. 12 / 15 Wind slight SW Cloud cover Variable Analyst DVH and CLK

servations ♀	JUV	U	Location	Notes and Comments
8	2		Tract C-a Transect 6	6 adult dark, 2 adult light, 2 juv dark
			Flat area near southern end of Tract	sage, P.J.
		7	South end West Census area	4 dark 3 white
		9	South of Little Duck Creek	1 light rest are dark
		9	start of Transect 8 on Horse Count	1 light color
			ridge after start on South end.	
		13	near end of transect 9	11 dark 2 bays.
			DVH	
		12	T.3 south of Duck Creek, on east side of Tract C-a	11 dark 1 gray: 3 juveniles
		5	T.7 of west side of Tract; No. of Water Gulch	1 white; 2 gray; 2 dark juvenile
		5	South of little duck Creek, on T.5	5 dark
		16	T.9 near end of transect	2 dark juvenile; 12 adult dark; 1 adult white; 1 adult gray
		76		

al Animals Counted: 86

nal Distribution:

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

Observed during mule deer winter census.

6.6.3.1.2-3

/Study 83/61 Date Flown 12/9/74 Species Wild Horse Survey Area West Canon Area

rvers: R(rear) Dennis VanHorn L(front) Craig Kling Pilot/Aircraft Les Pam / Cessna 206 U

t 1096/1102 Finish 1126 Est. ground speed & alt. 80 mph @ 175' above ground.

conditions: Ground cover Fair Light Fair Air good

her: Temp. 25°/30° Wind _____ Cloud cover _____ Analyst DVH + CLK

rvations			Location	Notes and Comments
♂	JUV	U		
9			Transect 2 just before Sagebrush Hill	all appeared to be adults
				7 dark snow + brushy area
				1 light
				1 Chestnut
2			Transect 3 on Sagebrush Hill	1 gray + 1 chestnut added to herd recorded on Transect 2 which probably moved during census
			DVH	
2			on beginning of Transect 1, at very start	1 white juv: 1 dark juv: 8 dark adult
3			#1 fourth ridge top into transect	2 charcol juv.: 1 palamino (gold) adult:
				4 dark adult; 1 light adult: 1 brown adult.
1			#2 in Corral gulch	juv. dark: adult gold: 3 adult gray:
2			#2 ridge top between Spruce & Boxelder gulch	5 dark: 1 light: 2 charcol
2			#4 on Sagebrush hill	2 adult brown: charcol juv: charcol gray juv w/ white spot on forehead
1			#4 at end of transect 4	1 adult white - 4 adult dark - 1 juv. light

l Animals Counted: 53 + 11 + 11 = 75

al Distribution: scattered, small groups

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.6.2.1.2-4

I/Study 83/61 Date Flown 12/9/74 Species Wild Horse Survey Area East census Area

ervers: R rear Dennis Van Horn L (rear) Craig Elkins Pilot/Aircraft Len Pann / Cessna 206 U

rt 0912 Finish 1041 Est. ground speed & alt. 80 mph @ 175'

ng conditions: Ground cover Fair to poor Light good Air excellent

her. Temp. 20°/25° F Wind calm Cloud cover None Analyst C.H.S + D.V.H.

rvations			Location	Notes and Comments
♀	JUV	U		
	3		Transect 7 northing road up from Ellsworth approx 1 mi	
			DVH	
			None	

Animals Counted: 11

Distribution: in one herd on 84 mesa.

ECI

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM

6.6.3.1.2-5

/Study 83/~~84~~61 Date Flown 12/9/74 Species W.Tl Horse Survey Area Tract C-a

rvers: R(rear) Dennis Vanthorn L(rear) Craig Kling Pilot/Aircraft Lee Paur / Cessna 206 a

t 0842 Finish 0907 Est. ground speed & alt. 80 mph @ 175'

ing conditions: Ground cover Fair Light Fair Air good

ther: Temp. 15° Wind calm Cloud cover NONE Analyst Craig L Kling, Dennis Vanthorn

Observations			Location	Notes and Comments
2	JUV	4		
		6	Sec 17 T2S R99W near mine into Boxelder	sagebrush 1 white, 5 dark
			OVH	
			#1 on ridgetop so. of box elder	2 dark, 1 chestnut, 1 white, 1 gray, 1 black

BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM C.G.&.I.&.C.O

/Study 83/61 Date Flown 12/27/74 Species Horses Survey Area Tract 6a, 84 mesa Ridges West of Tract

ervers: R Craig Kling L — Pilot/Aircraft John Quackenbush / Bell Helicopter

t 0840 Finish 1130 Est. ground speed & alt. Varied according to conditions

ing conditions: Ground cover good/Fair Light excellent/good Air good

ther: Temp. 10°/15° Wind Variable/Strong SW Cloud cover High Analyst CLK

Observations AD	JUV	U	Location	Notes and Comments
			Observed during Sex and Age Counts for Mule Deer	
			#9 SW edge of Tract	1 dark all appears to be 5 light adults dark has infected nose.
			Southerly Slope Dead Horse Ridge	2 gray 2 dark 1 white all adults
	3		past road east of airstrip	3 dark ad 2 chestnut adults 1 light ad 1 gray adult 2 dark Foal, 1 Foal didn't determine color
	1		on 84 mesa	2 light adult 1 dark adult 1 dark Foal

al Animals Counted: 25

al Distribution: scattered

location placed on Field Observation Sheet.

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BIG GAME AERIAL CENSUS REPORT AND DATA SUMMARY FORM * 6.6.2.1.2.-1

Proj/Study 83/61 Date Flown 1/14/75 Species Feral Horse Survey Area Rio Blanco Study Area

Observers: R F Kling L r VanHorn Pilot/Aircraft Len Pann / Cessna 206

Start 0903 Finish / Est. ground speed & alt. 80 mph @ 175' above ground

Viewing conditions: Ground cover Excellent Light good-fair Air good-fair

Weather: Temp. 29/43° Wind light/west Cloud cover High Analyst DVH + CLC

Observations			Location	Notes and Comments
	JUV	U		
Adults		1	* Observed during Mule deer winter counts and Raptor Counts	
9			Southern exposure sagebrush Hill	1 light, 6 dark, 2 brown
5			North of Boulder south facing slope	1 light 3 black, 1 brown.
6			Crest of Cathedral Bluffs south end	2 white, 4 dark
4			" " " " north end	
5			" " " " north end	
5	2		North of Water Gulch	all of them were dark
			DVH	
15	2		Transect on east side, * 4	SE¼ of Sec 17 T.1.S., R.98W. 1 adult Brown: 10 adult dark : 2 juvenile dark: 3 adults gray: 1 adult white
1			Transects on east side * 8, NE¼ SE¼ T.2S. R.99W.	Running in P-J: Black

Total Animals Counted: 54

Animal Distribution: ~~

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oj/Study 83/61 Date Flown 1 Feb 75 Species Feral Horse Survey Area Rio Blanco Study Area

servers: R & C Kling L & D VanHorn Pilot/Aircraft Lear Pam / Cessna 206

art 0846 Finish 1615 Est. ground speed & alt. 80 mph @ 175' above grid

nting conditions: Ground cover Excellent snow cover Light Good Air Fair

Temp. 22°/28° Wind 15 West Cloud cover 30%/Clear Analyst DVA + CSK

Observations			Location	Notes and Comments
Adult	JUV	U		
			* Observed during Raptor and Big Game Counts	
4			#2 West Census area Dead Horse Ridge	on windblown ridge
				only tracks observed in west census area
				were where horses were spotted.
4	1		#3 west census area Airplane Ridge	Back ridge
8	2		#4 west census end of transect	(2 Foals), 3 light, 3 chestnut 4 dark
12	1		Airplane Ridge # 12 Raptor survey	1 small dark, 10 large dark 2 large light
		14	North of Water Gulch # 12 raptor survey	
		8	T.6. Tract C-a, start of transect	5 dark; 1 gray; 1 dark gray; 1 brown
3			T.7. East side of tract 84 mesa	6 dark adult; 2 dark juv.; adult gray-1 adult brown-2.; adult light-1; adult chesnut-1; juv. chesnut-1
3	1		T.10 84 mesa Sec. 23 T.1S. R.99W.	Juv. dark; adult gray-1; adult dark 2
		15	T.1 West side.	1 white : 14 dark
		6	T. 1 west side	5 dark : 1 white
		7	T. 2 on Saybrush hill	all dark
3	2		T. 4 South of Coral gulch	dark adult- 2; chesnut juv.-2; adult white -1
44	50			

al Animals Counted: 105

nal Distribution: windblown ridges west of Tract C-a plus usual location on 84 mesa.

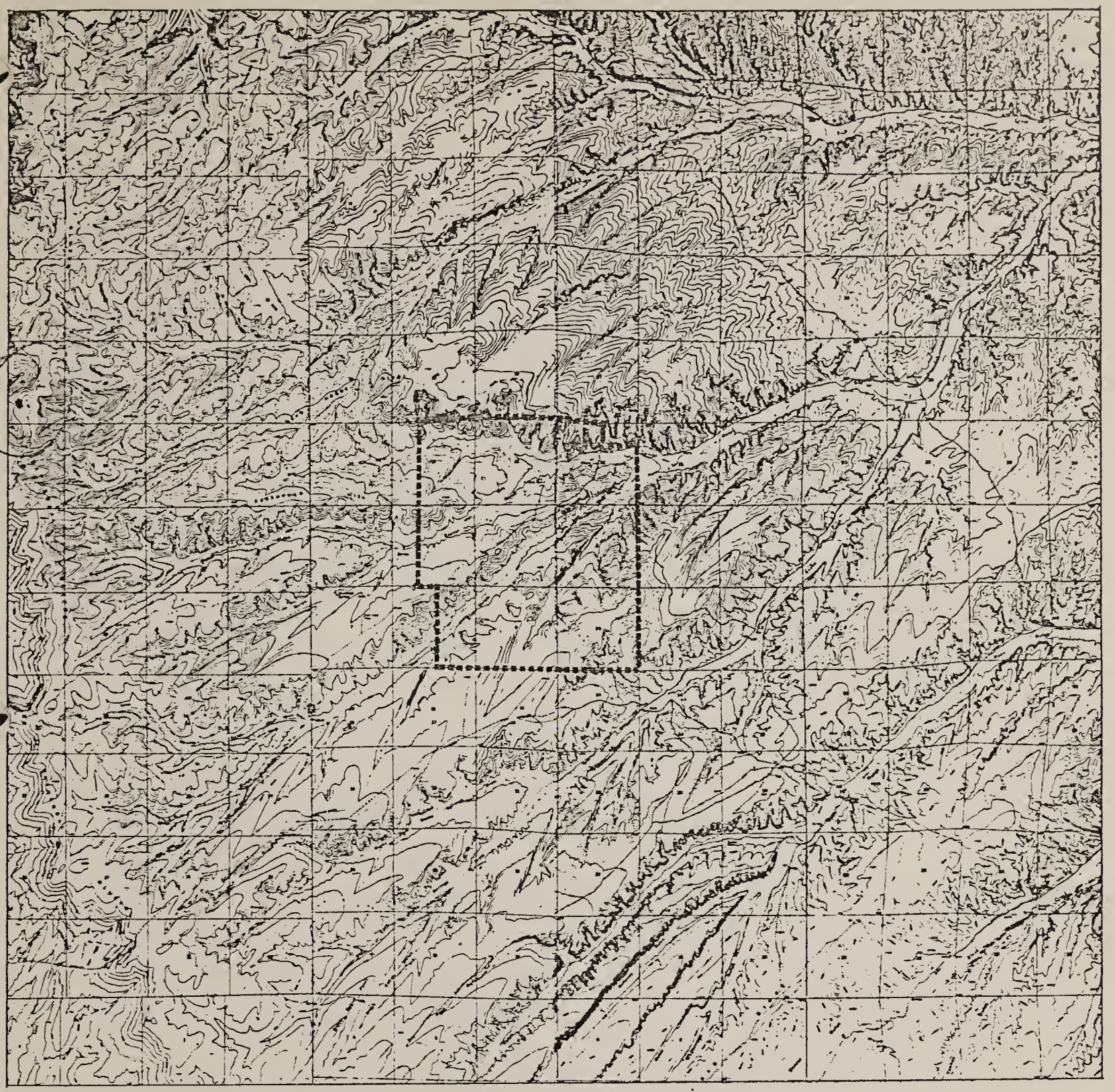
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Large Mammals (14.1.2)

Distribution Records

FIELD OBSERVATIONS

14.1.2-1



Species Mule deer Date 10/10/74 Time —

Means of Identification obs

Number Observed 1 ♂ 1 ♀ _____

Adult 1 Juv. _____

Habitat grassy

Other Information* _____

Observer JLE EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-2



Species Mule deer Date 10/10/74 Time —

Means of Identification obs

Number Observed 2 ♂ 1 ♀ _____

Adult 1 Juv. 1

Habitat Mixed Brush

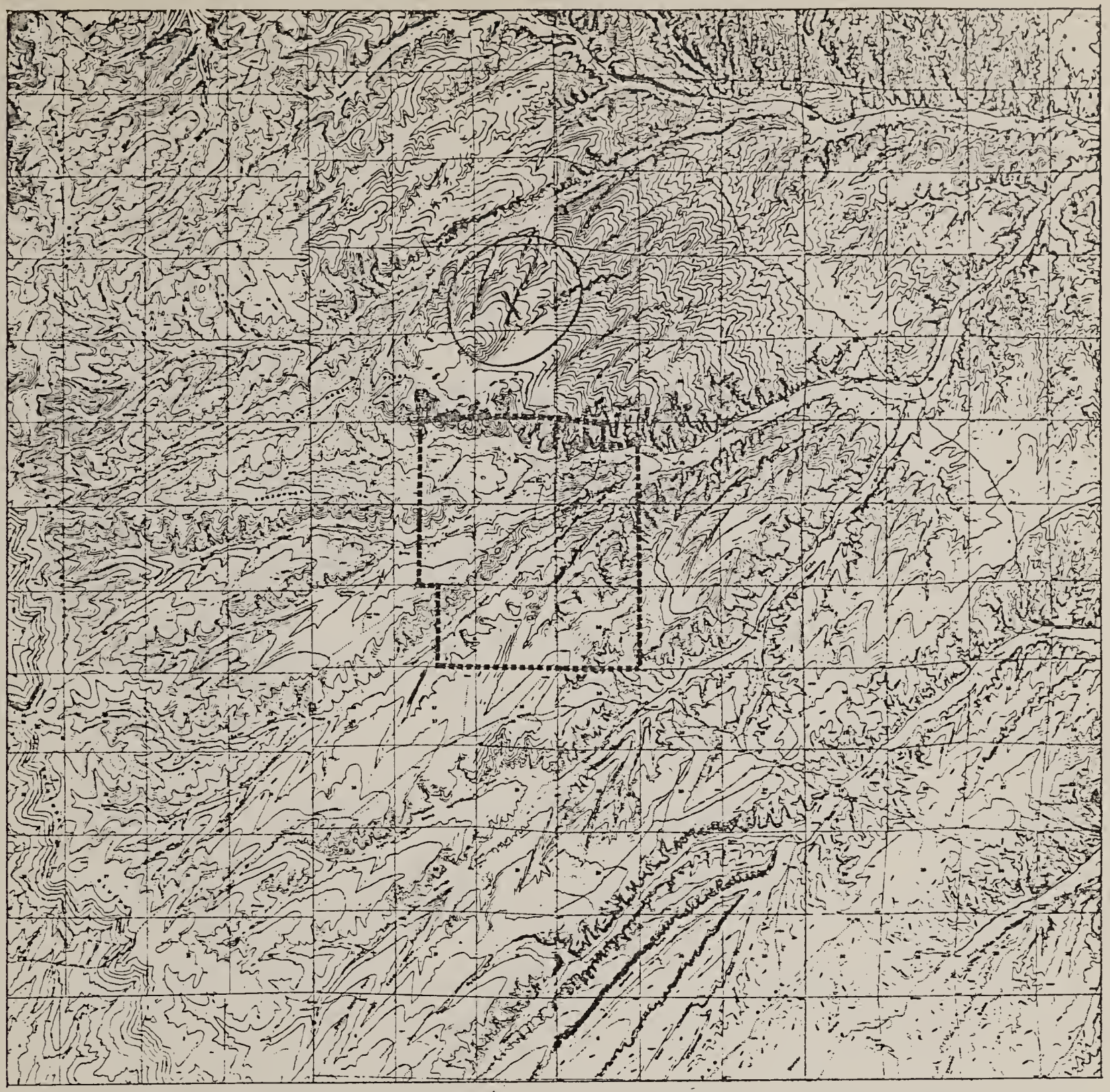
Other Information* _____

Observer SLE, BK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

H.1.2-3



Species Mule Deer Date 10/10/74 Time —

Means of Identification obs.

Number Observed 3 ♂ ____ ♀ ✓

Adult ✓ Juv. ____

Habitat Pinyon - Juniper

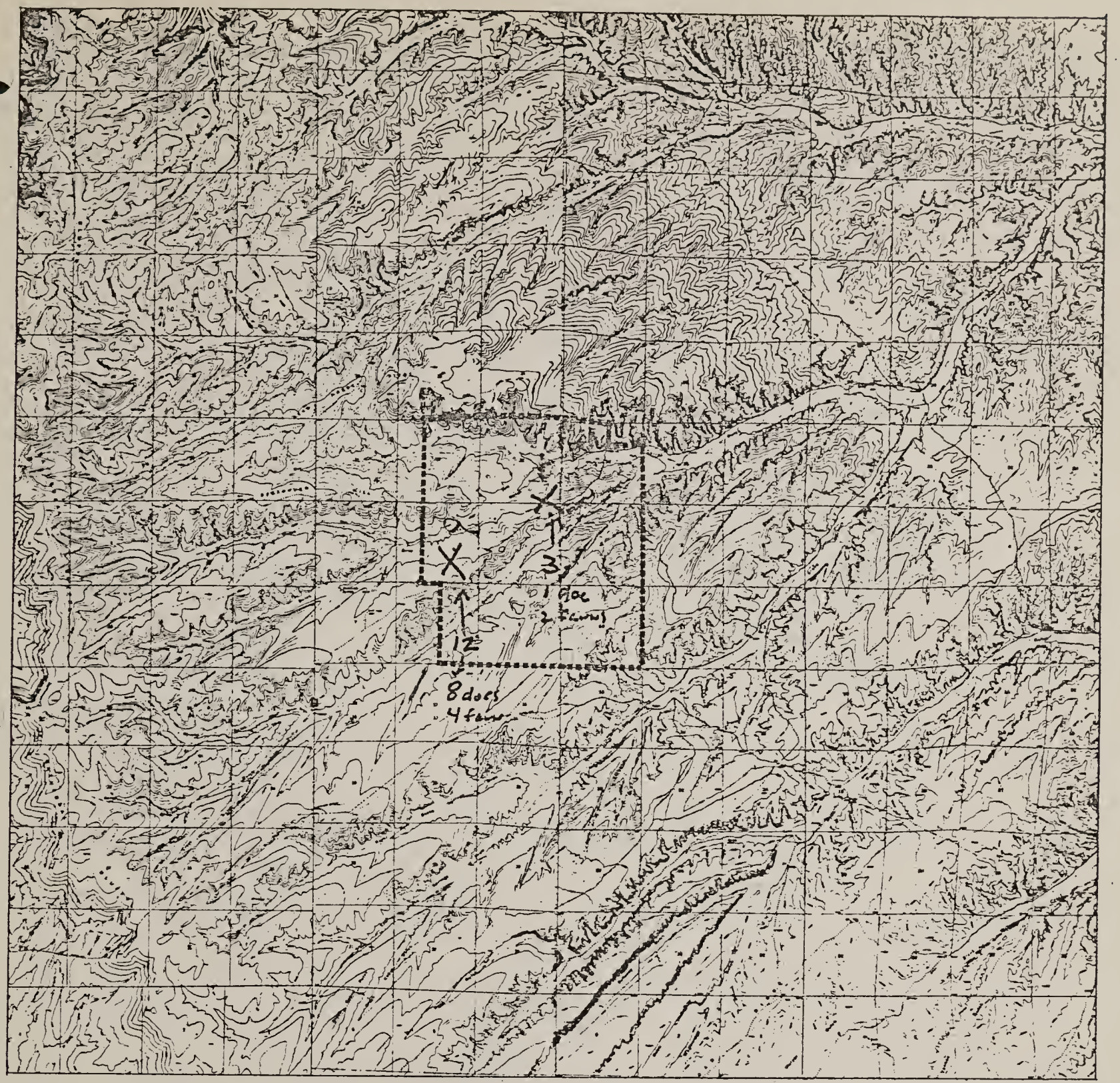
Other Information* ____

Observer S G Martin

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

H.1.2-4



Species Mule deer Date 12/6/74 Time 4:20 pm

Means of Identification observation

Number Observed ~~12~~ 15 ♂ _____ ♀ ~~5~~ 9

Adult ~~9~~ 8 Juv ~~6~~ 7 ? sex

Habitat sage

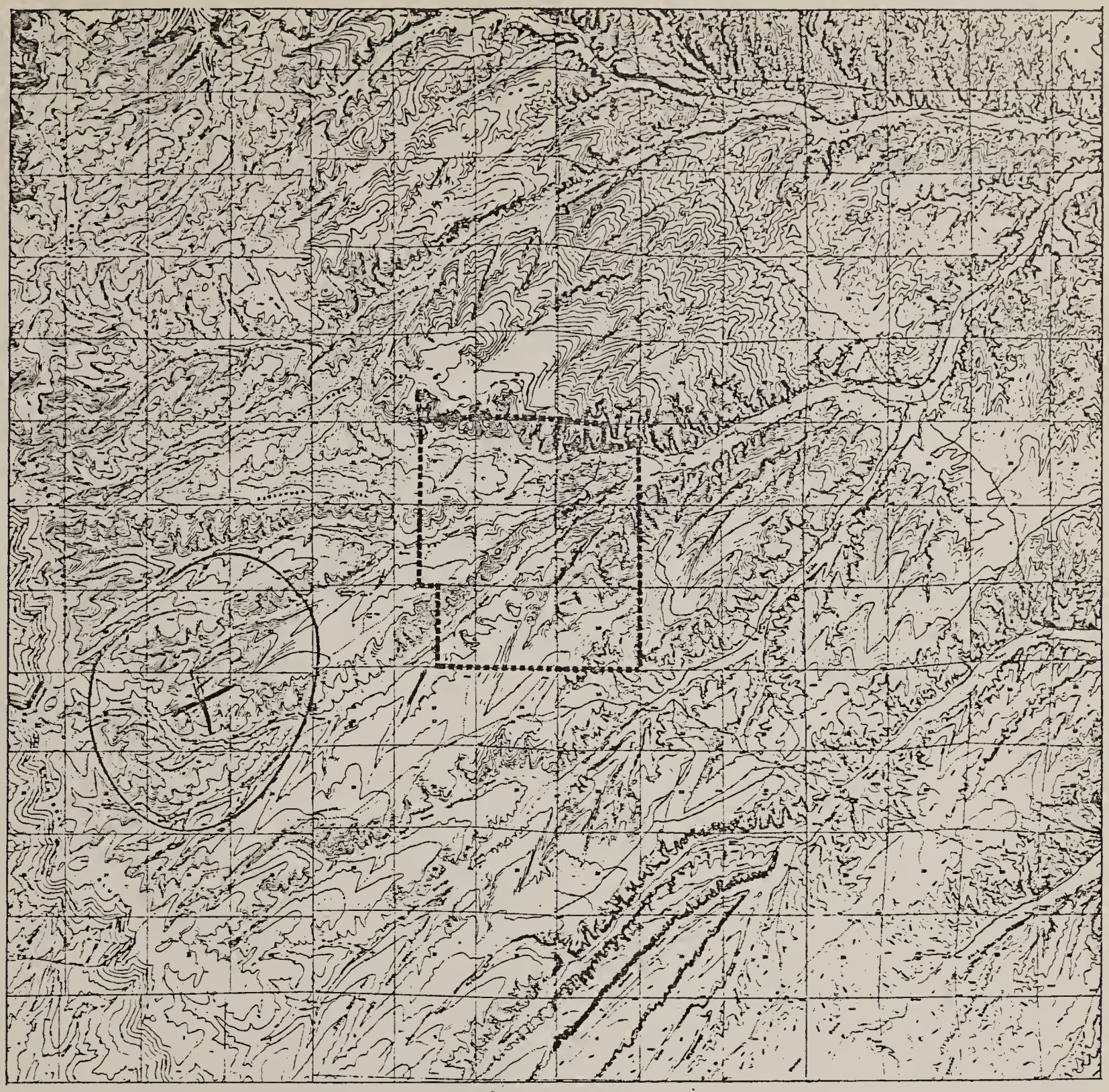
Other Information* _____

Observer Turner

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-5



Species Mule deer Date 12/7/74 Time 3:15 pm

Means of Identification obs.

Number Observed 6 ♂ ____ ♀ 5 ?

Adult 5 Juv. 1 ? sex ?

Habitat sage - upland meadow

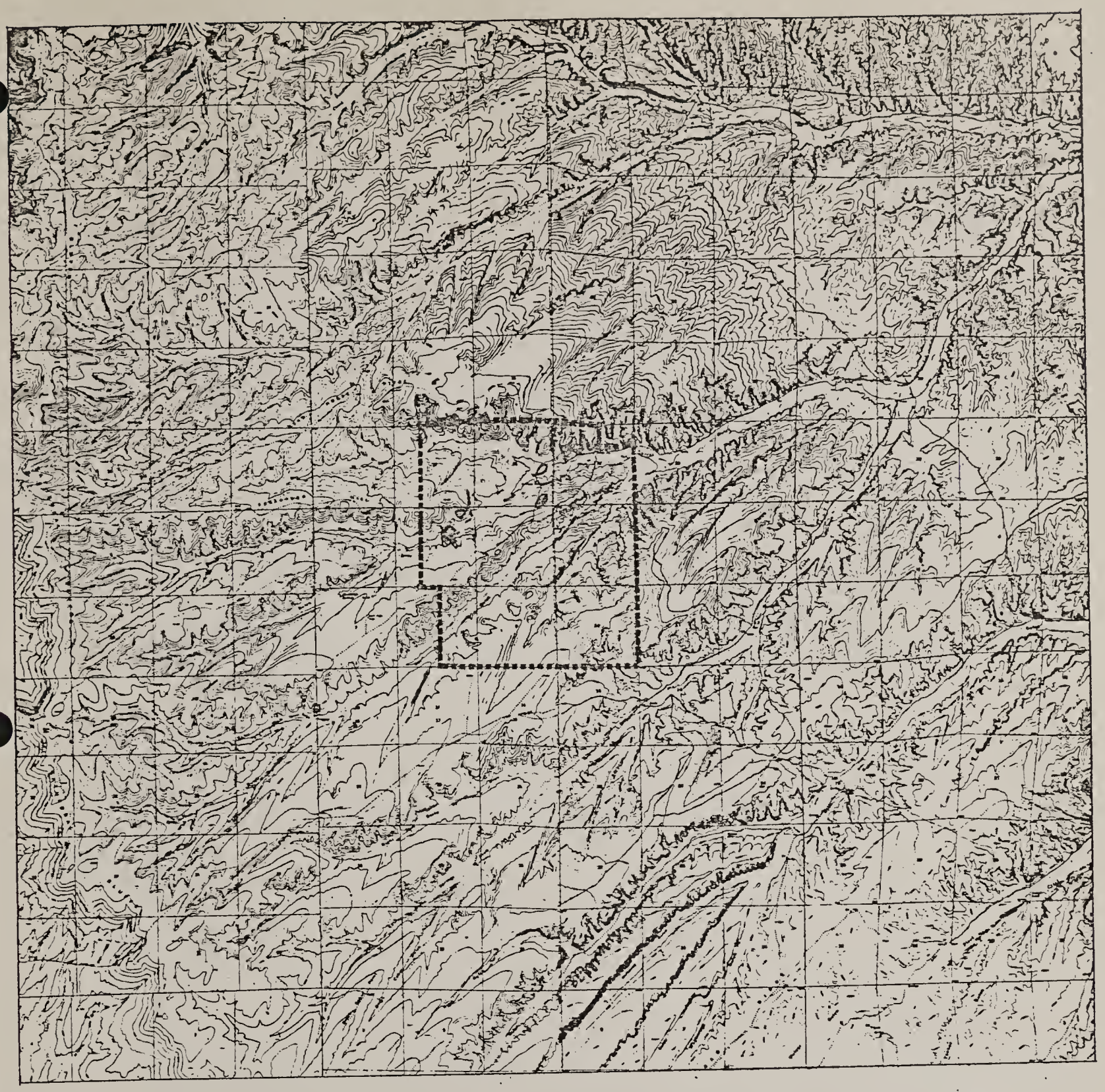
Other Information*

Observer Baker / Turner

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-6



Species Mule deer Date 12/8/74 Time 1:20

Means of Identification Tracks | sight

Number Observed 2 ♂ — ♀ —

Adult ✓ Juv. ____

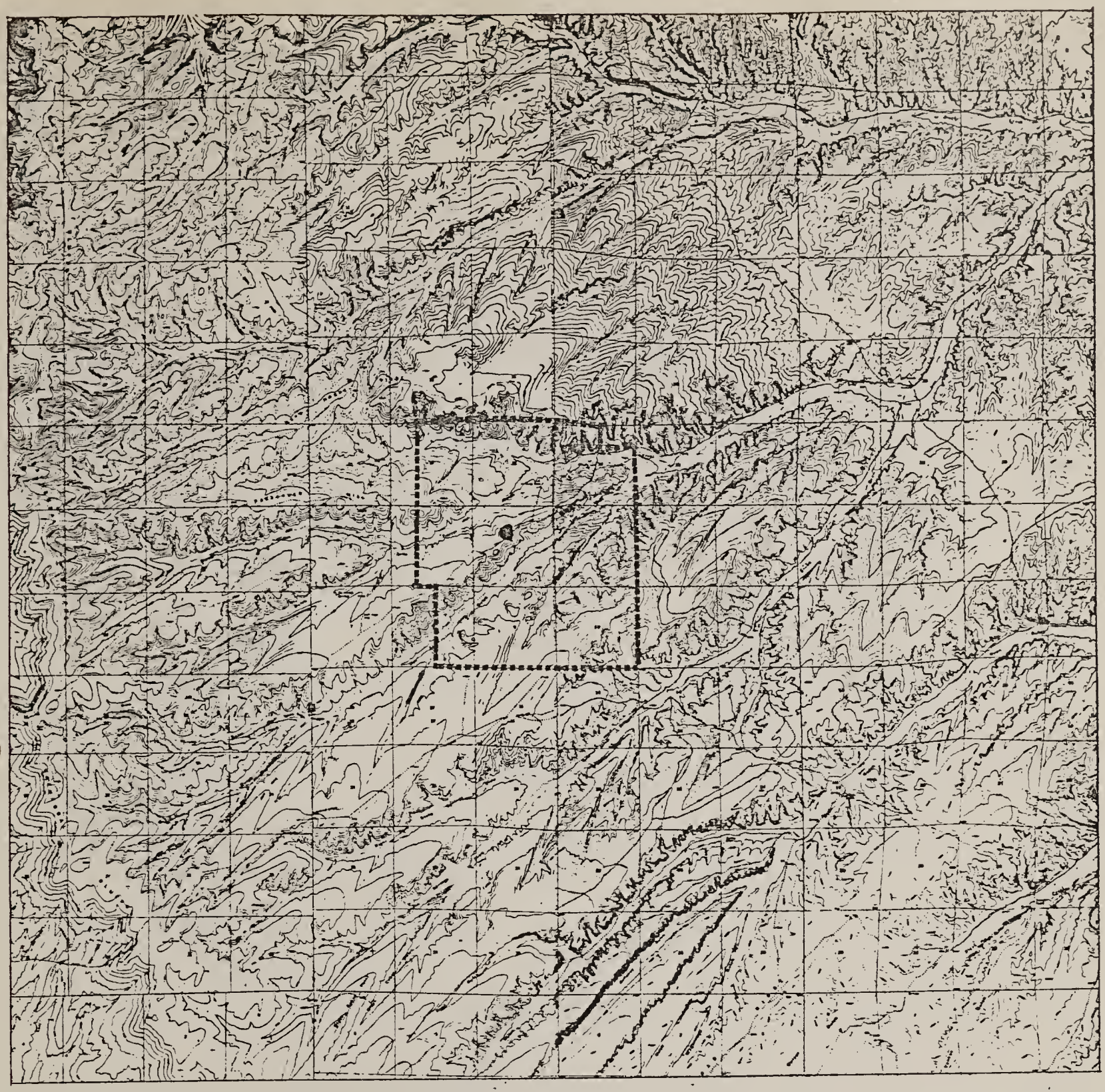
Habitat Mountain brush

Other Information* 7 seen by hunting club | 5 does, 2 fawns
0 1

Observer Ellenwood - Sanz

* Include any distinguishing field marks for horses.

14.1.2-7



Species mule deer Date 12/8/74 Time 4:00 PM.

Means of Identification observation

Number Observed 3 ♂ ♀ ✓

Adult 3 Juv.

Habitat pinion juniper

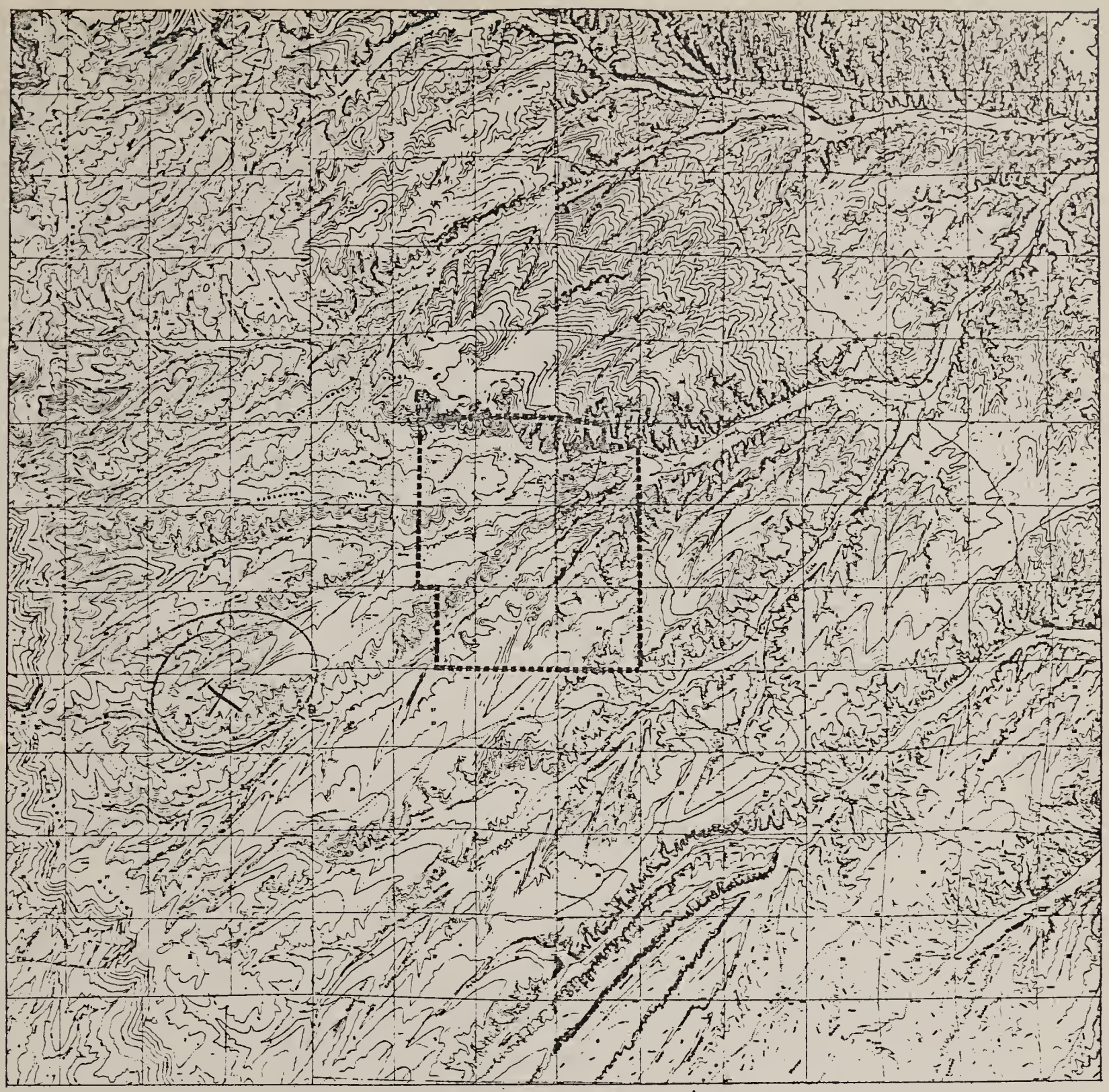
Other Information*

Observer R.M. / F.C.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-8



Species Mule deer Date 12/8/74 Time 10:05 Am

Means of Identification obs

Number Observed 6 ♂ ____ ♀ 4

Adult 4 Juv. 2

Habitat Sg - mixed brush

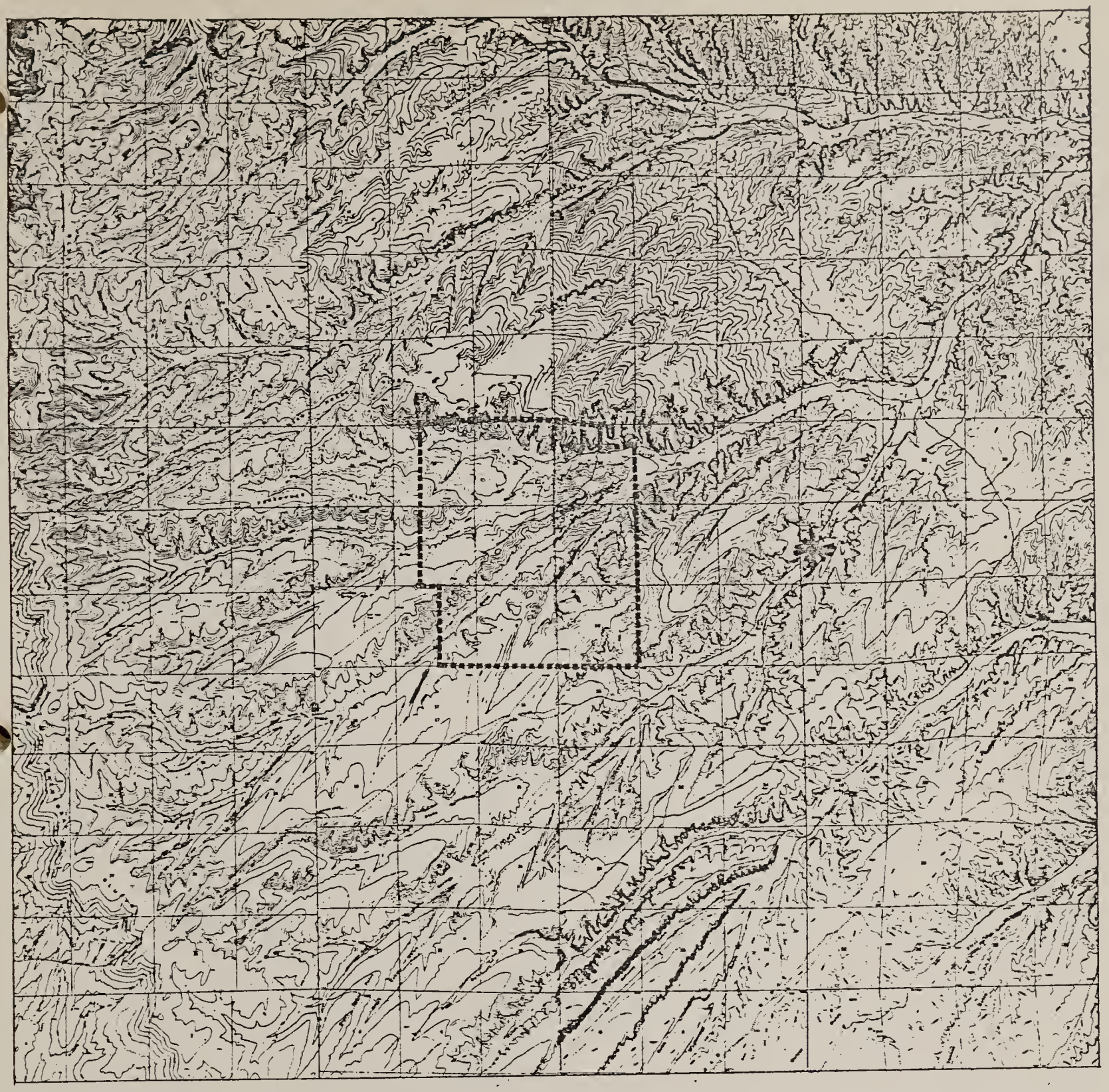
Other Information*

Observer Turner

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-9



Species Mule deer Date 12/9/74 Time 3:15 PM

Means of Identification observation

Number Observed 5 ♂ ♀ ✓

Adult ✓ Juv.

Habitat Pinon Juniper / sage.

Other Information*

Observer J.C./R.M.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-10



Species Mule Deer Date 12/9/74 Time 1:00

Means of Identification Observation

Number Observed 10 ♂ ____ ♀ ✓

Adult ✓ Juv. ✓

Habitat Mountain brush and sage

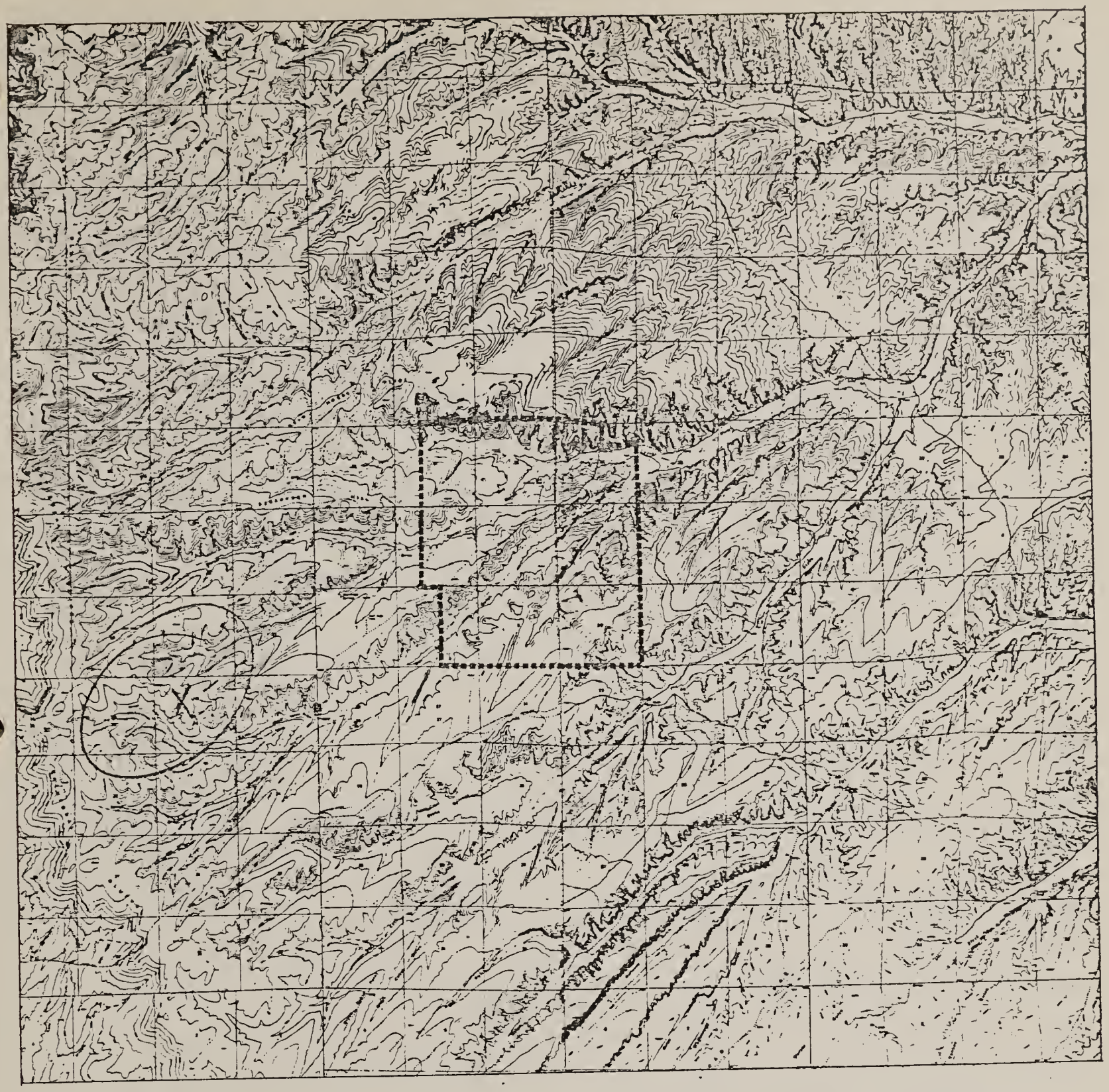
Other Information*

Observer Ellinwood - Sams

* Include any distinguishing field marks for horses.

14.1.2-11

FIELD OBSERVATIONS



Species Mule deer Date 12/12/14 Time 9:10 am

Means of Identification obs.

Number Observed 9 ♂ ____ ♀ 6

Adult 6 Juv. 3

Habitat Sage-mixed brush

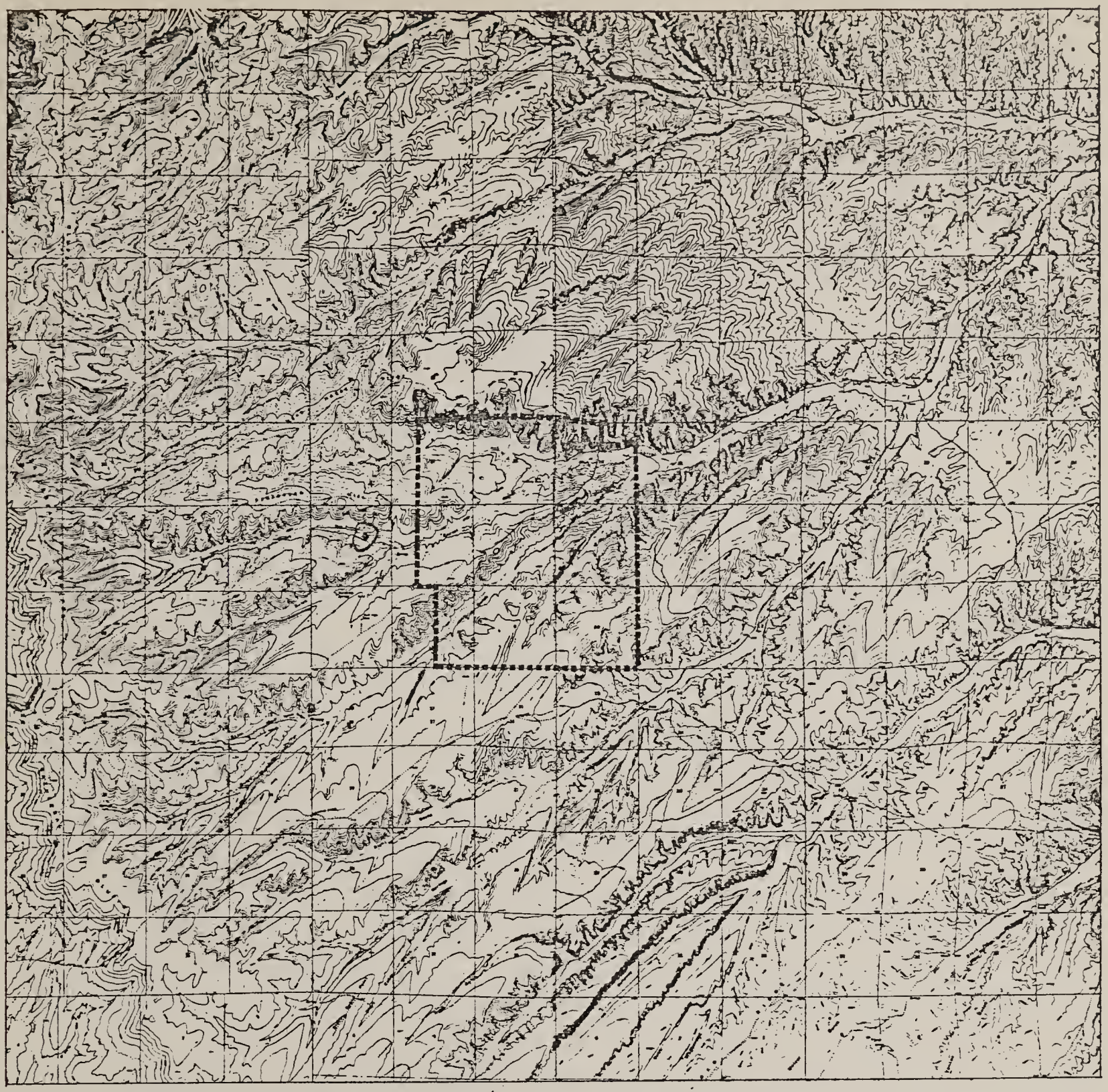
Other Information*

Observer Tom Bahr

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-12



Species Fawn carcass Date Dec 6, 1974 Time 1450

Means of Identification Visual

Number Observed 1 ♂ ____ ♀ —

Adult ____ Juv —

Habitat in bottom of mtn shrub transect on tract.

Other Information* Killed early Am by 3 coyotes. 2 ravens, 18 magpies feeding on remains.

Observer VA

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-13



Species Mule Deer Date 2/12/75 Time 2200

Means of Identification direct obs

Number Observed 3 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat Pinyon - Juniper - Sage

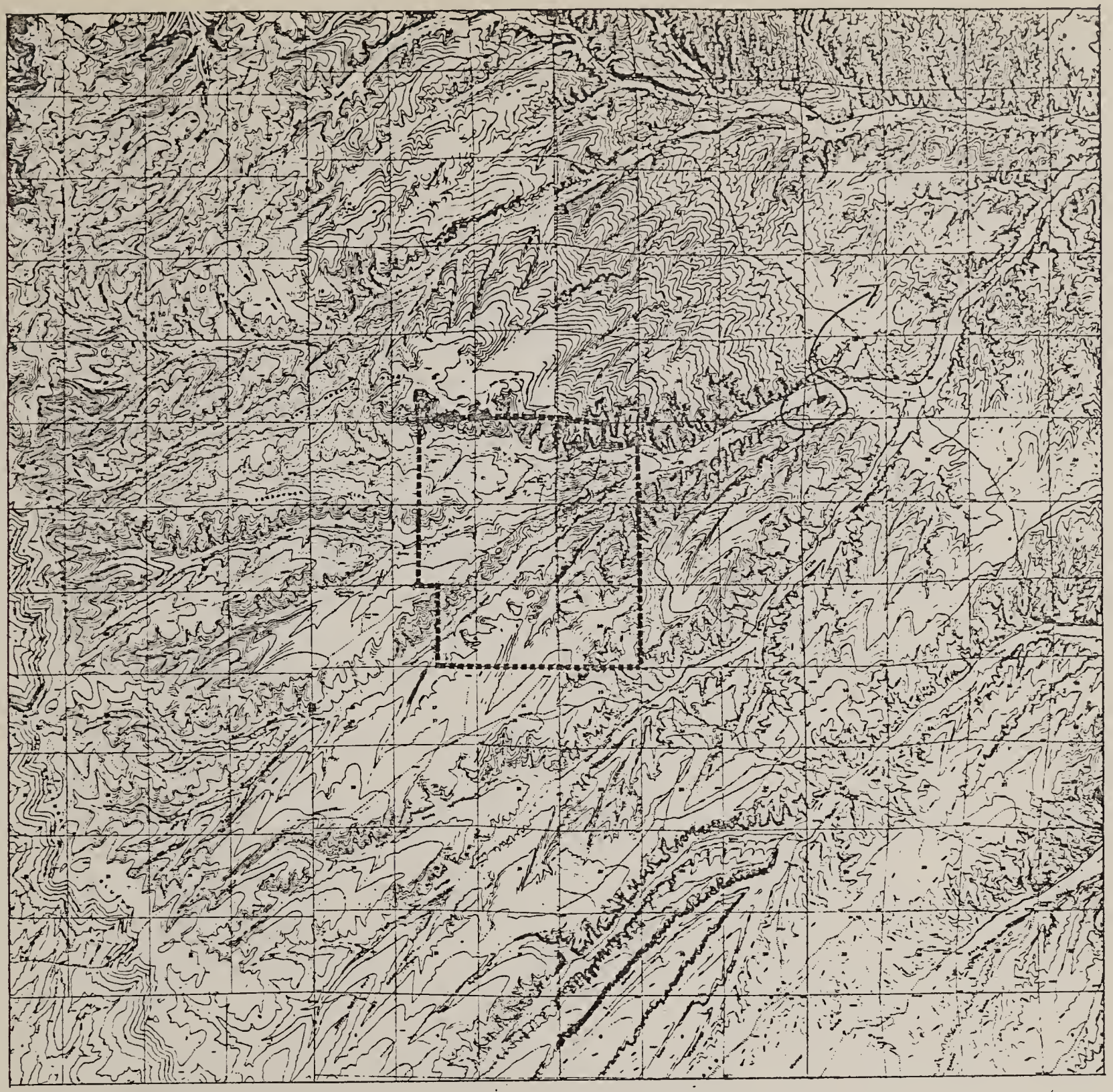
Other Information* during night survey for leptospirosis

Observer Baker, Sena

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-14



Species Mule Deer Date 2/12/75 Time 1100

Means of Identification Sight

Number Observed 11 ♂ 11 ♀ _____

Adult _____ Juv. _____

Habitat PJ - Sage

Other Information* _____

Observer Baker, Sams

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-15



Species Mule Deer Date 2/12/75 Time 12:00

Means of Identification direct obs

Number Observed 22 ♂ ____ ♀ 22

Adult ? Juv. ?

Habitat P-J, sage

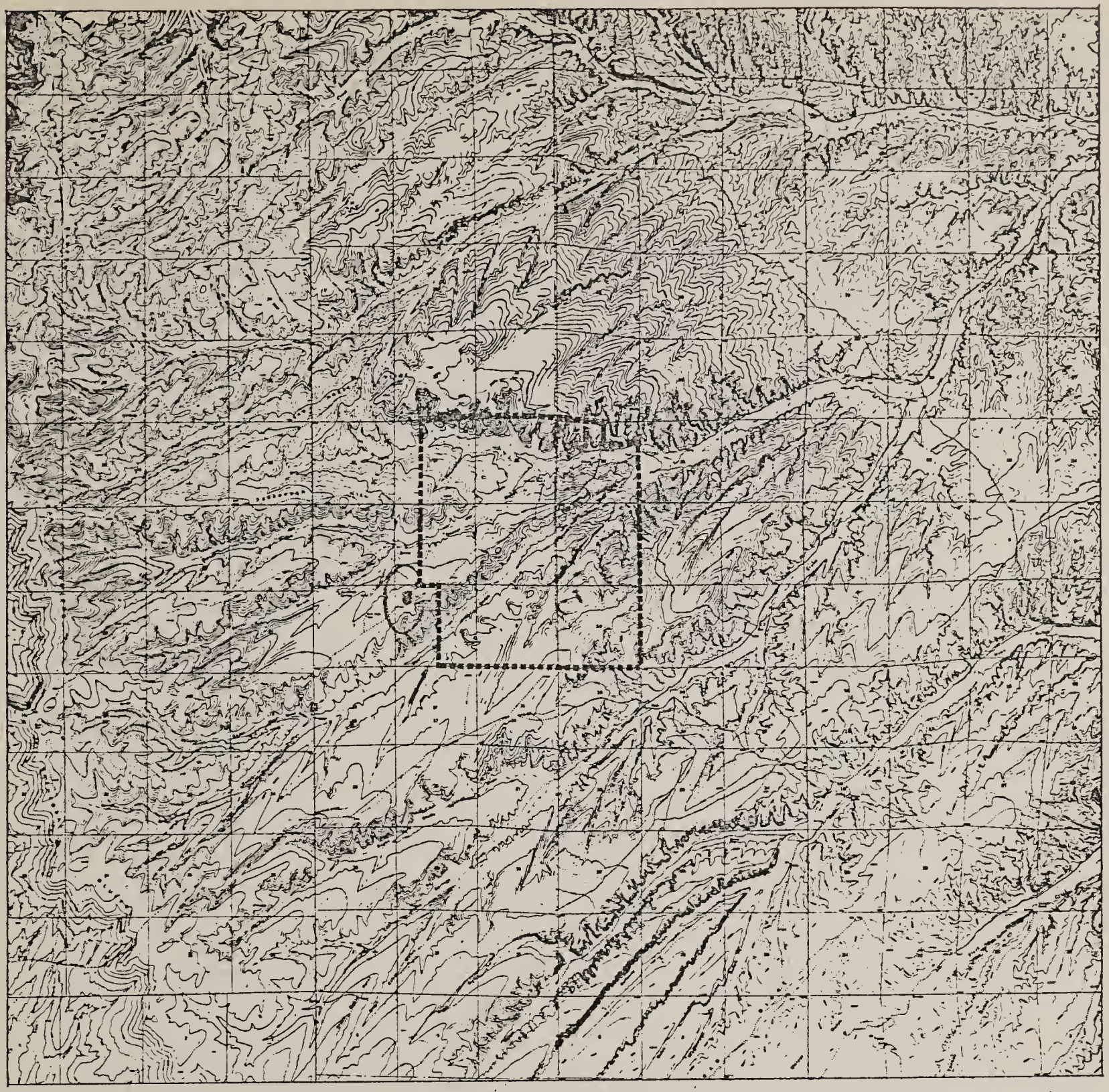
Other Information* ____

Observer [illegible]

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-16



Species Mule Deer Date 2/12/75 Time 1600

Means of Identification direct obs.

Number Observed 3 ♂ ♀ 3

Adult Juv.

Habitat Pinyon - Juniper - Sage

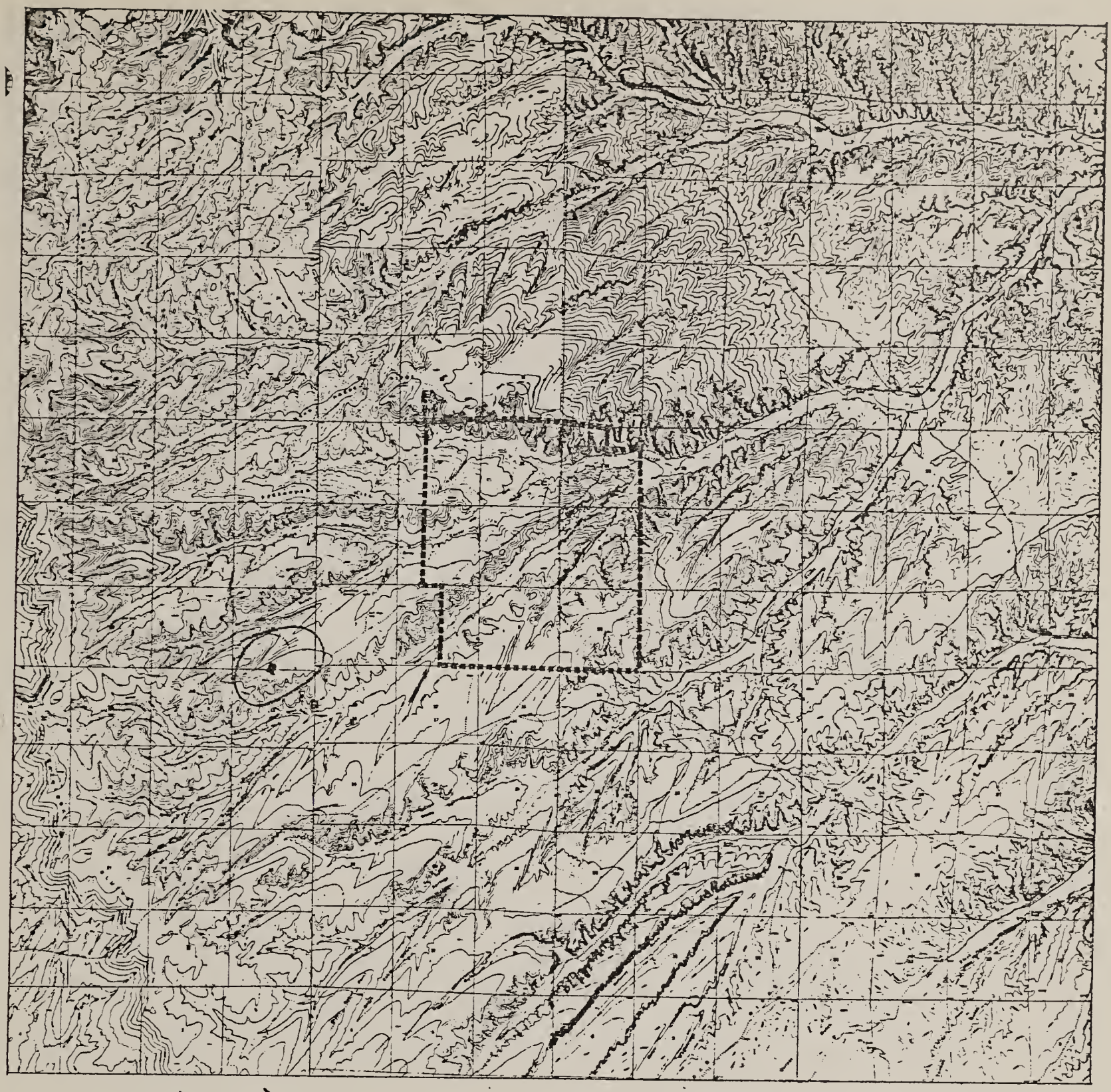
Other Information*

Observer Lane, Baker

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-17



Species Mule Deer Date 2/14/75 Time 1000

Means of Identification direct obs

Number Observed 1 ♂ ____ ♀ 1

Adult ____ Juv. ____

Habitat Pinyon-Juniper - Sage

Other Information* ____

Observer Baker

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-18



Species Mule deer Date 2-16-75 Time 0951

Means of Identification Visual

Number Observed 10 ♂ ____ ♀ ✓

Adult 4 Juv. 6

Habitat P-J + SAGE BOTTOM

Other Information* ONE doe WAS MARKED W/ CF+G White Neck Collar

Observer VH + JC.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-19



Species Mule deer Date 2-16-75 Time 0950

Means of Identification Visual

Number Observed 5 ♂ 3 ♀ 2

Adult 5 Juv. 3

Habitat SAGE BOTTOM, corral gulch

Other Information*

Observer YH + JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-20



Species Mule Deer Date 2/16/75 Time 5:00 PM

Means of Identification Visual

Number Observed 2 ♂ _____ ♀ _____

Adult X Juv. _____

Habitat Sage

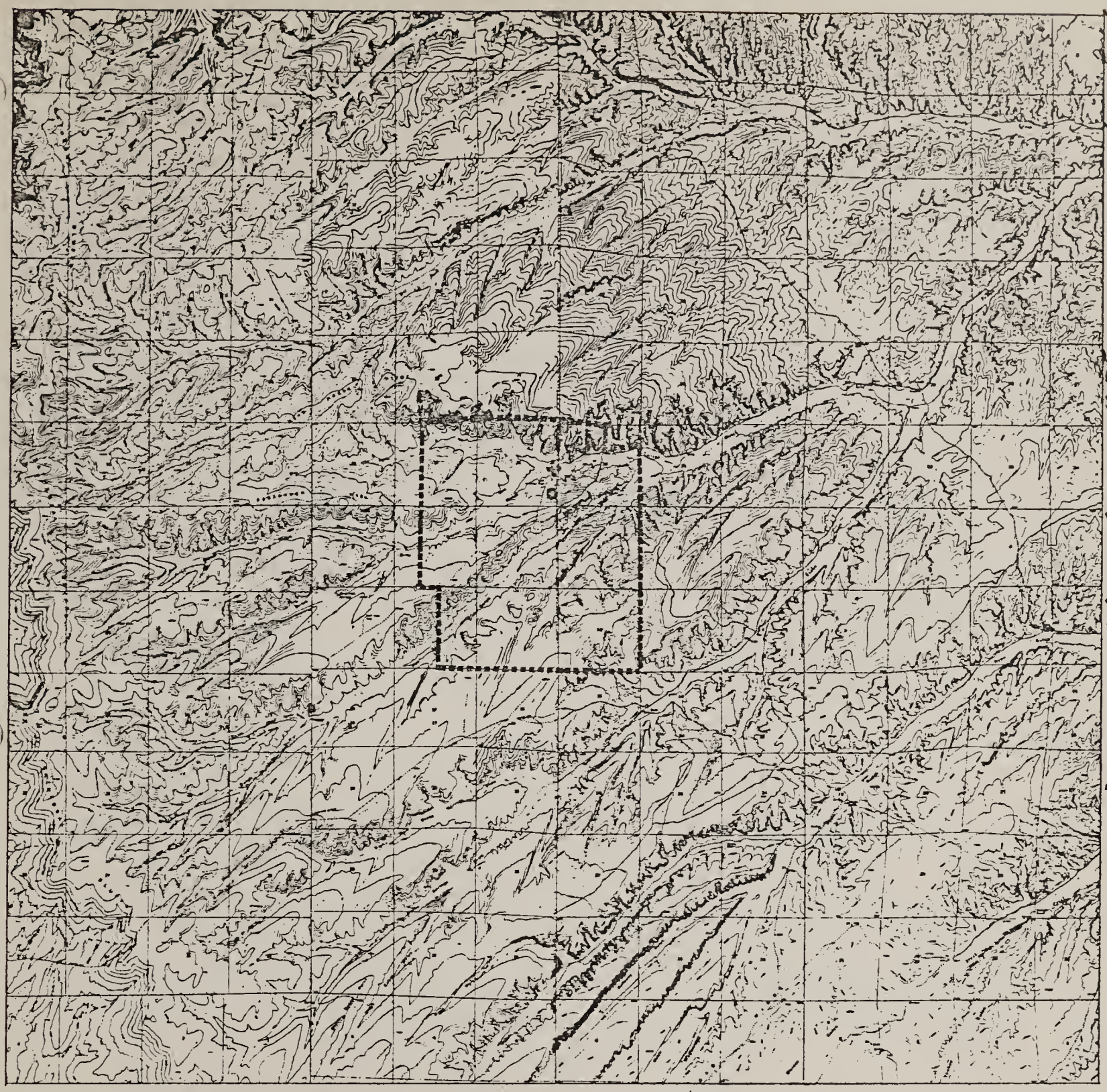
Other Information U*

Observer Canalosi

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-21



Species Mule Deer Date 2/19/75 Time _____

Means of Identification _____

Number Observed 16 16 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat +Rabbitbrush • North slope P.J.

Other Information* Antlered buck separate from non-antlered deer by 100-150 yards, lagging behin

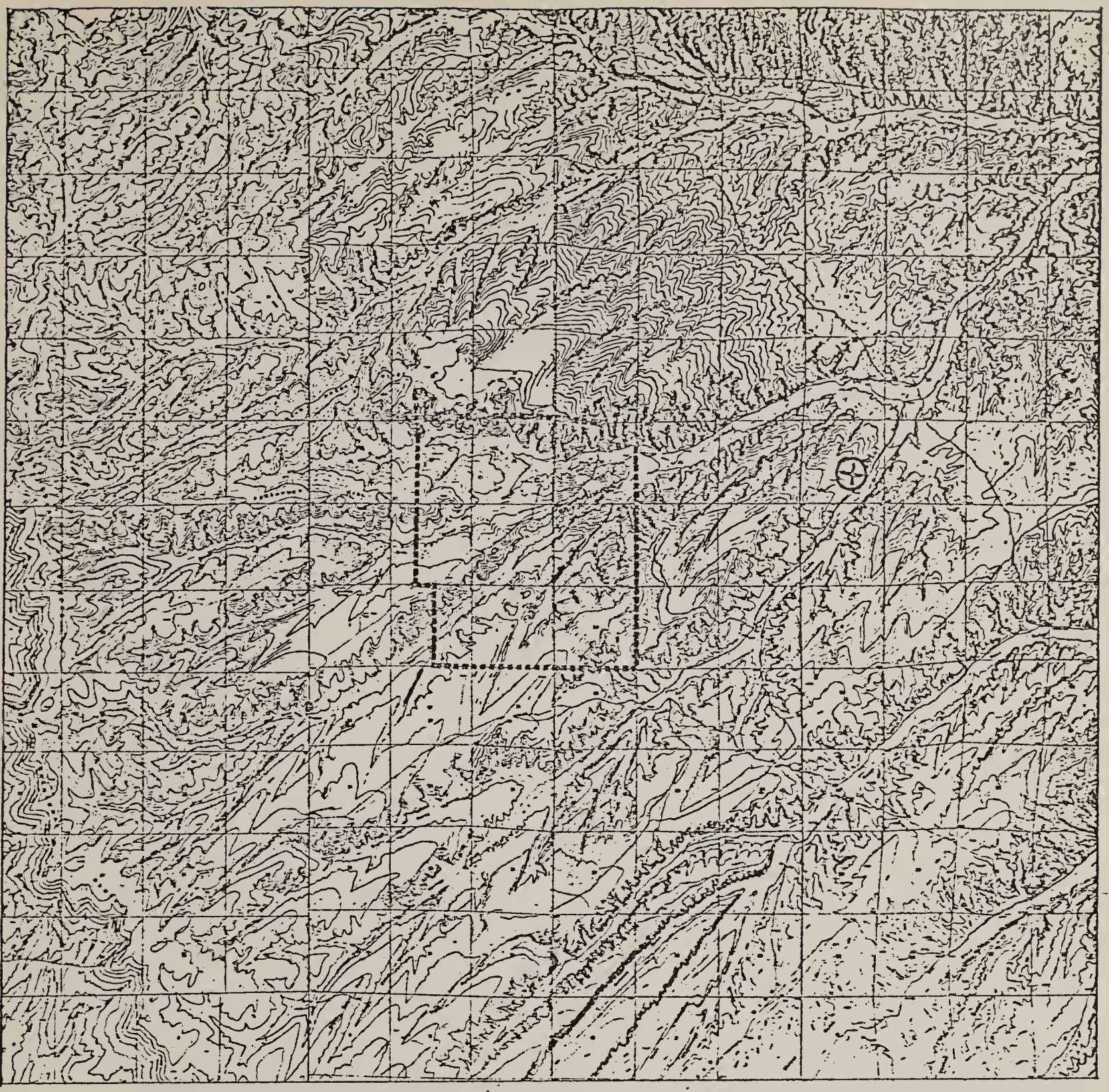
Observer Cavenlosi

* Include any distinguishing field marks for horses.

Note deer spooked in assumed P.J. 20 minutes later ground sloped at they were traveling [illegible] ft. to the Sw. [illegible] ft.

FIELD OBSERVATIONS

14.1.2-22



Species Mule deer Date 2-19-75 Time _____

Means of Identification - eyes -

Number Observed 24 ♂ _____ ♀ 15

Adult ✓ Juv. 9

Habitat SOUTH SLOPE P-J.

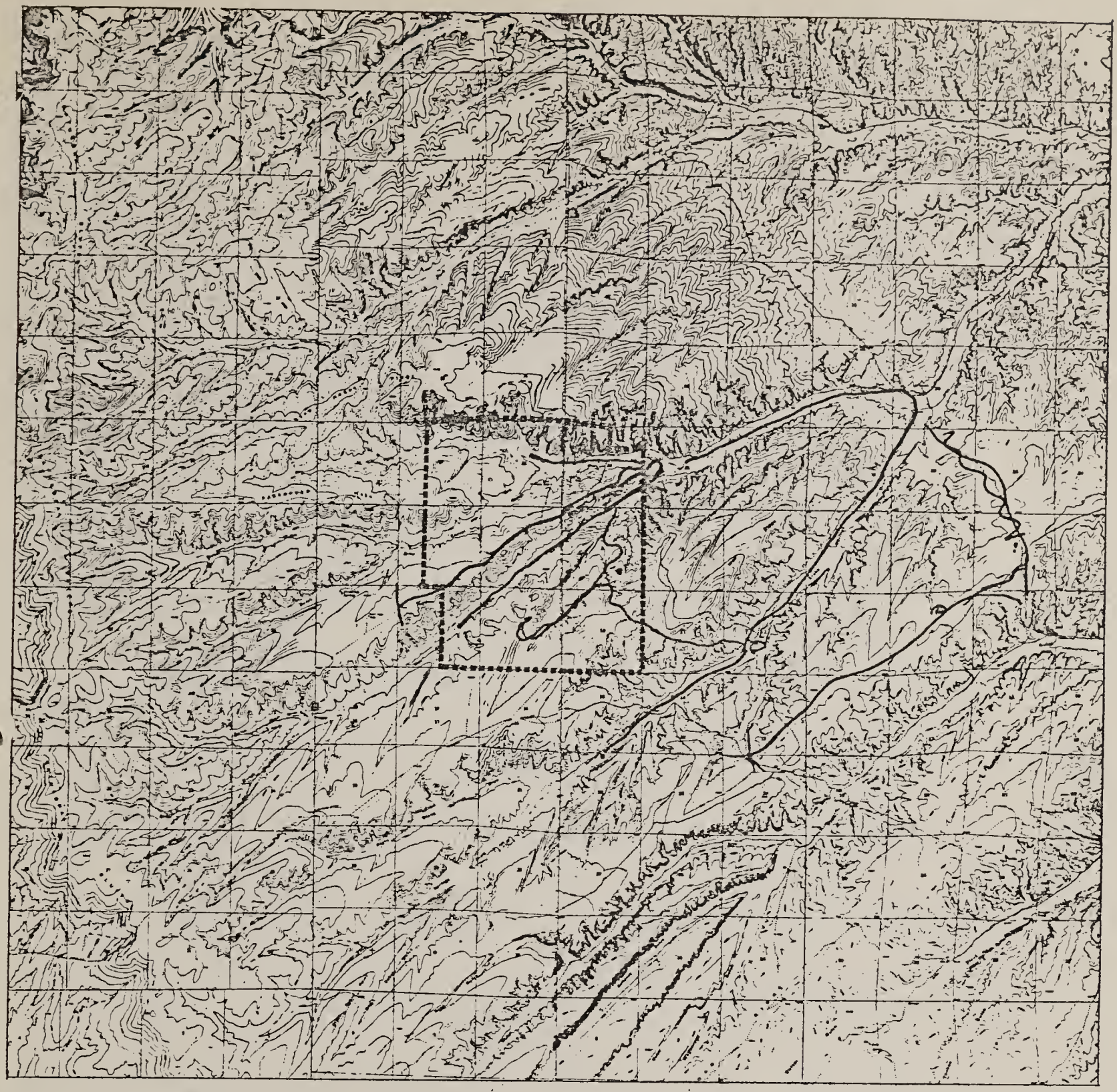
Other Information* 3 doe WITH FISH & GAME NECK collars; # 239, 236 & 229

Observer YH

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-23



Species Mule deer Date 2/20 Time 4 30

Means of Identification

Number Observed 1 ♂ ♀ 1 (2)

Adult Juv.

Habitat hillside sagebrush

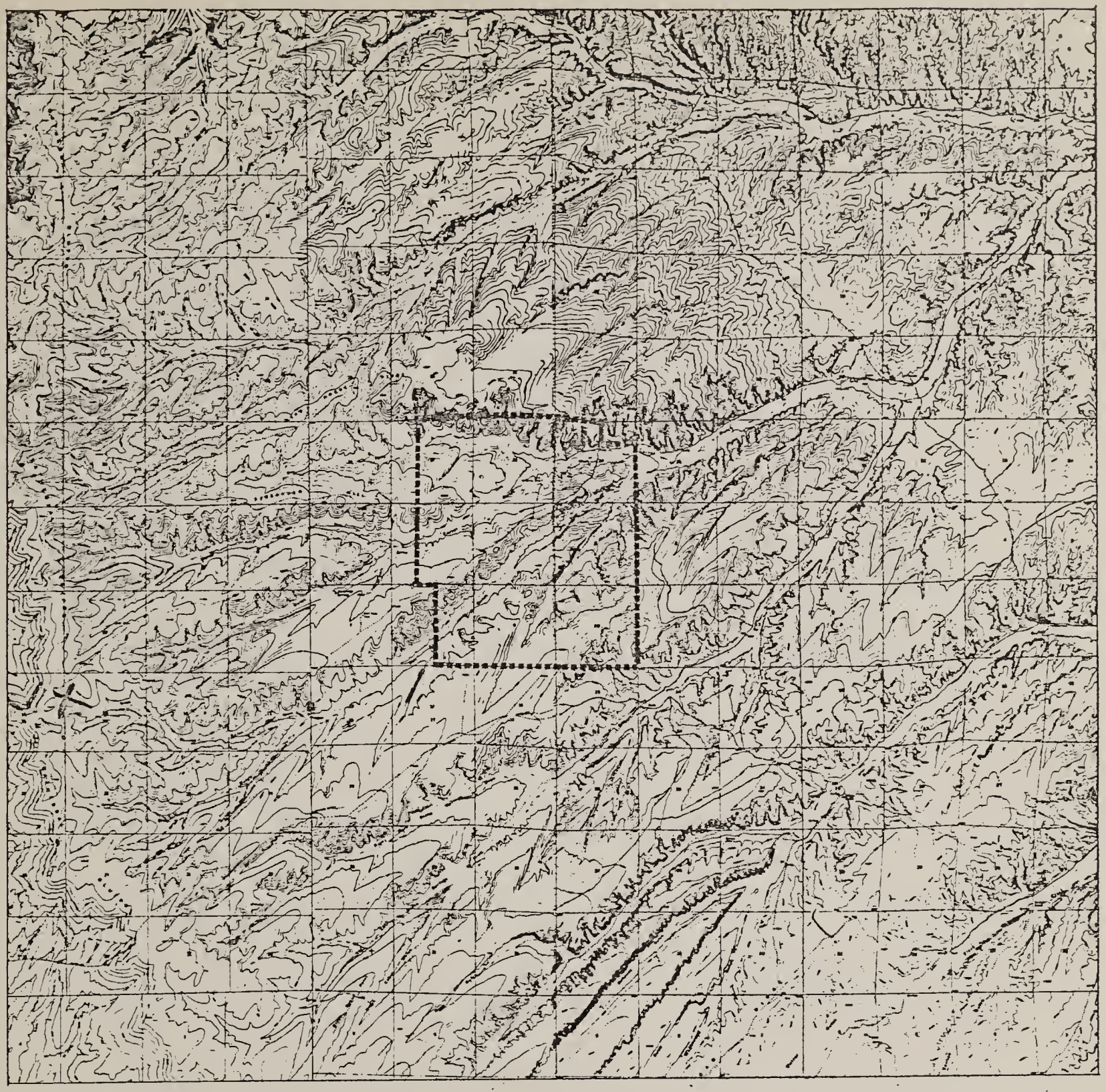
Other Information*

Observer Concalosi

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.2.2-24



Species wild horse Date 12/6/74 Time 2 30 pm

Means of Identification obs.

Number Observed 8 ♂ ♀

Adult 5 yearlings/Juv. 3

Habitat sage - upland meadow

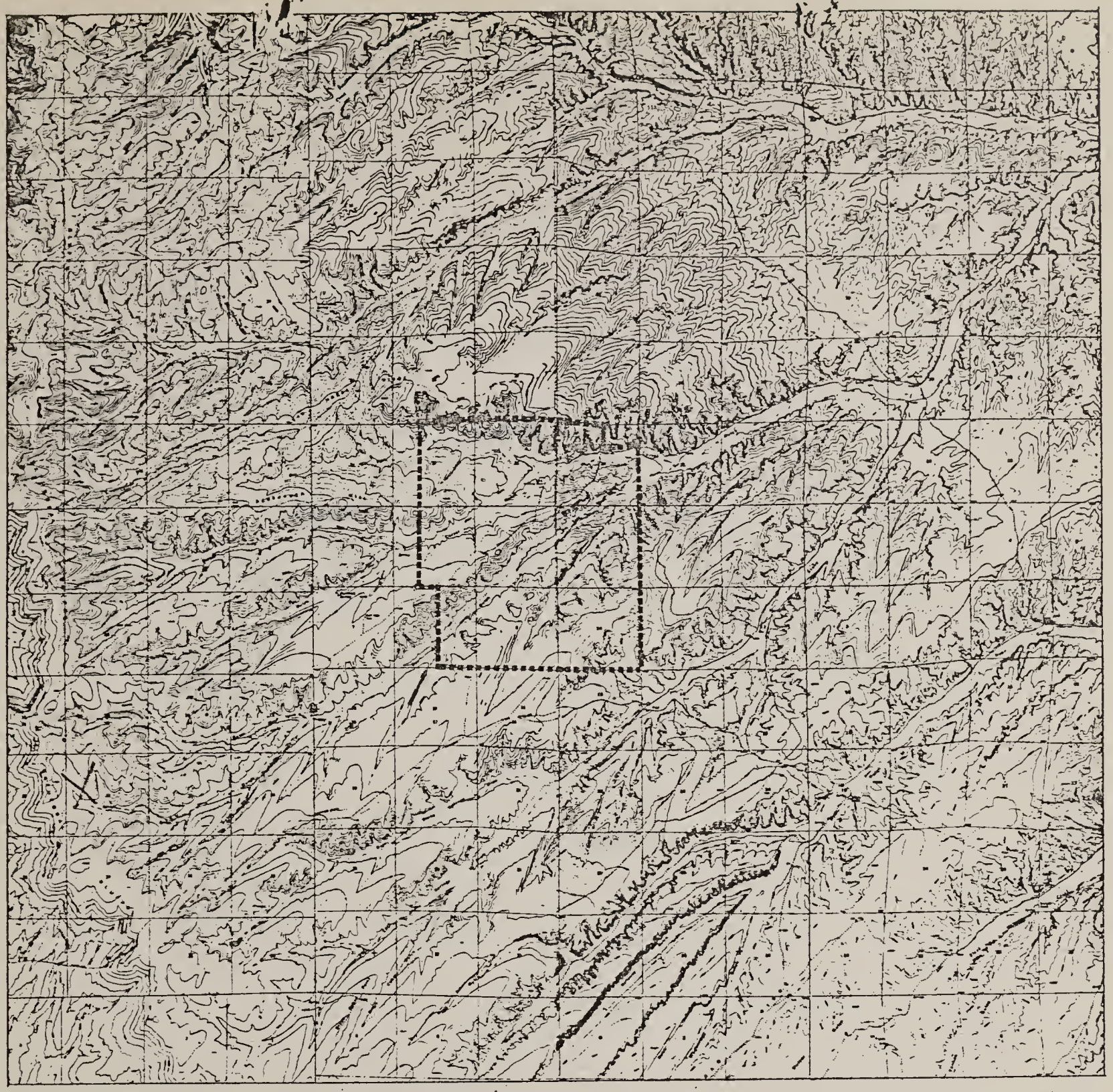
Other Information* did not see a stallion

Observer Turner

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

H.1.2-25



Species wild horse Date 12/6/74 Time 3 15 pm

Means of Identification observation

Number Observed 11 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat upland meadow

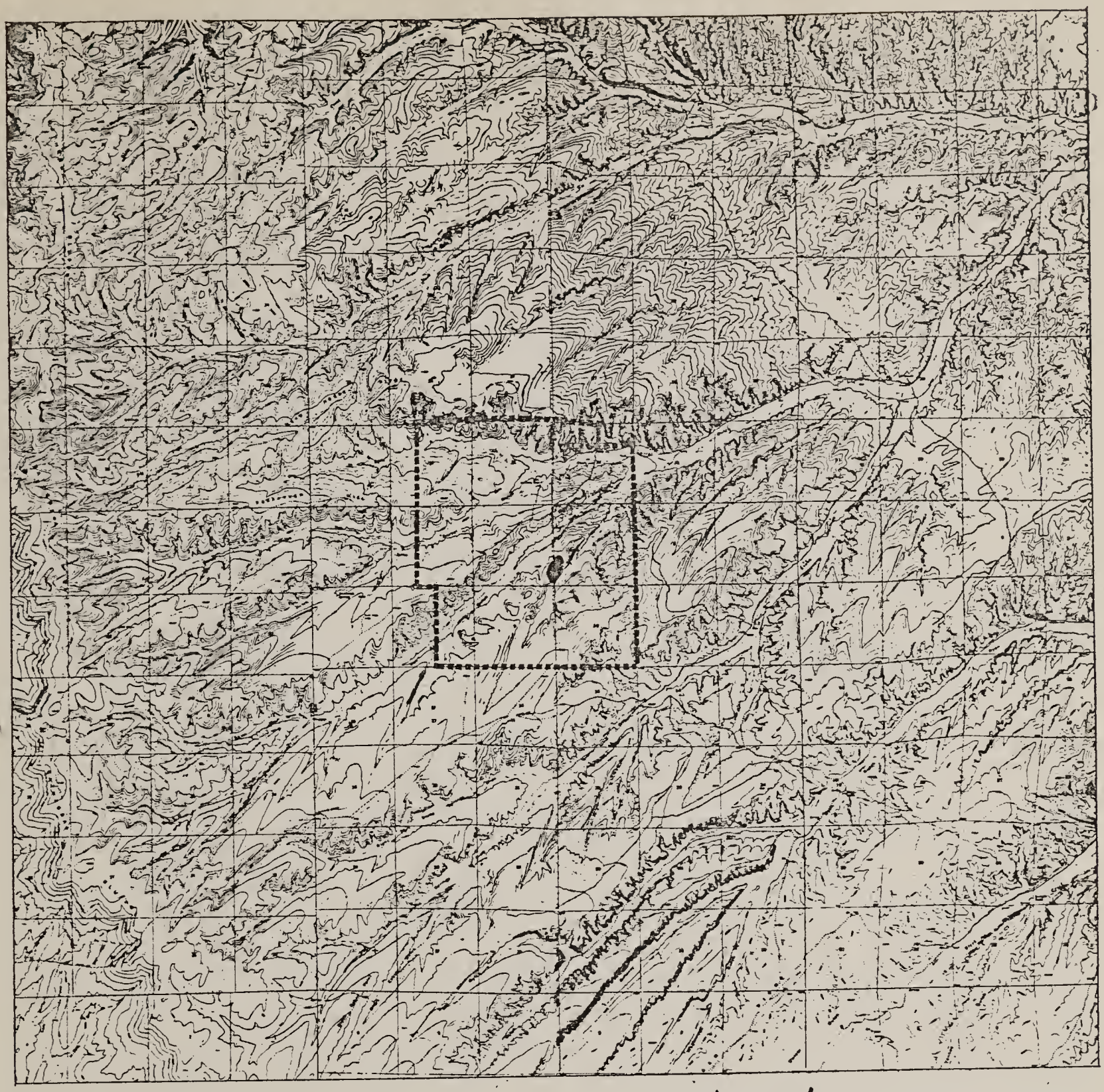
Other Information* horses were far away - unable to determine age, sex nor stallion

Observer Turner

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-26



Species Horses Date 12/8/74 Time 3:30 PM

Means of Identification observation

Number Observed 4 ♂ ____ ♀ ✓

Adult 3 Juv. 1

Habitat Pinon juniper / sage

Other Information* 3 mares with one yearling

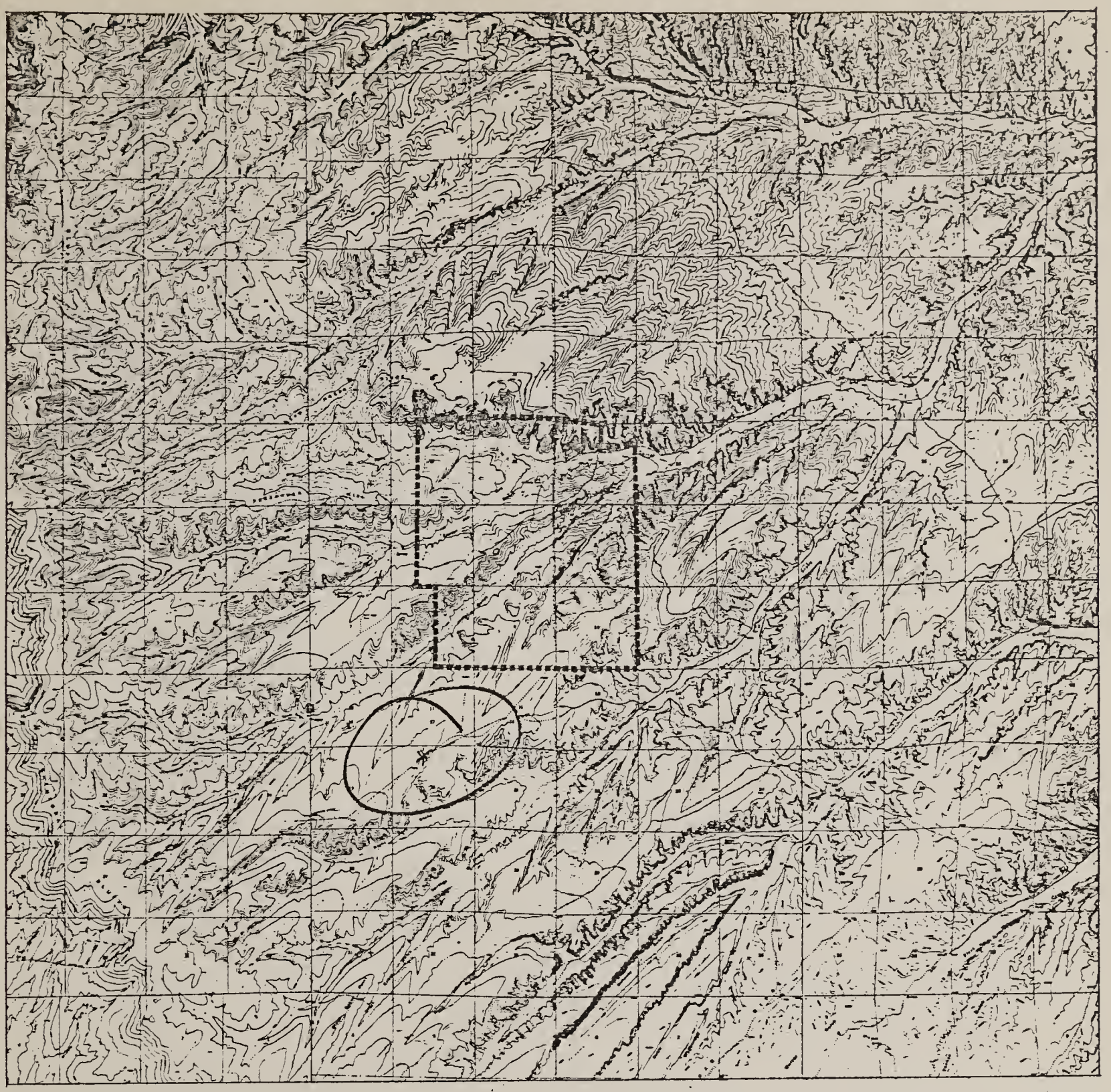
2 mares all black - 1 mare dark brown W/ gray around yearling known.

Observer R.M. / J.C.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-27



Species Horses Date 12/10/74 Time 3:45 PM

Means of Identification Observation

Number Observed 8 ♂ _____ ♀ _____

Adult ✓ Juv. _____

Habitat Pinion Juniper / Sage

Other Information* 5 brown / 1 white / 1 black

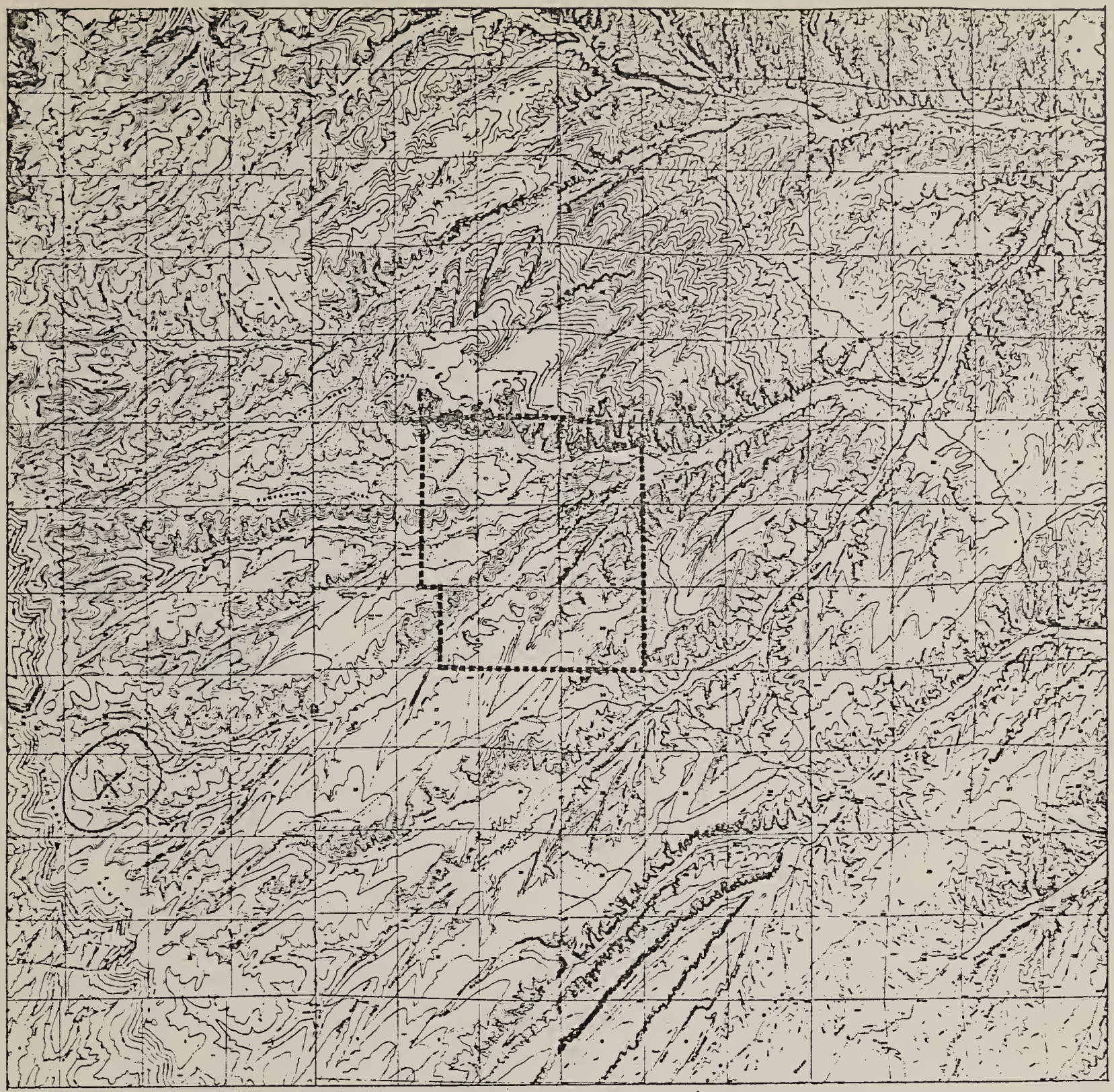
Three Pinion Juniper trap grid # 12.

Observer R.M. / L.C.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.2.7-28



Species Wild Burro Date 12/11/84 Time 0900

Means of Identification obs.

Number Observed 10 ♂ ____ ♀ ____

Adult 8 Juv. 2

Habitat mixed brush mountain region

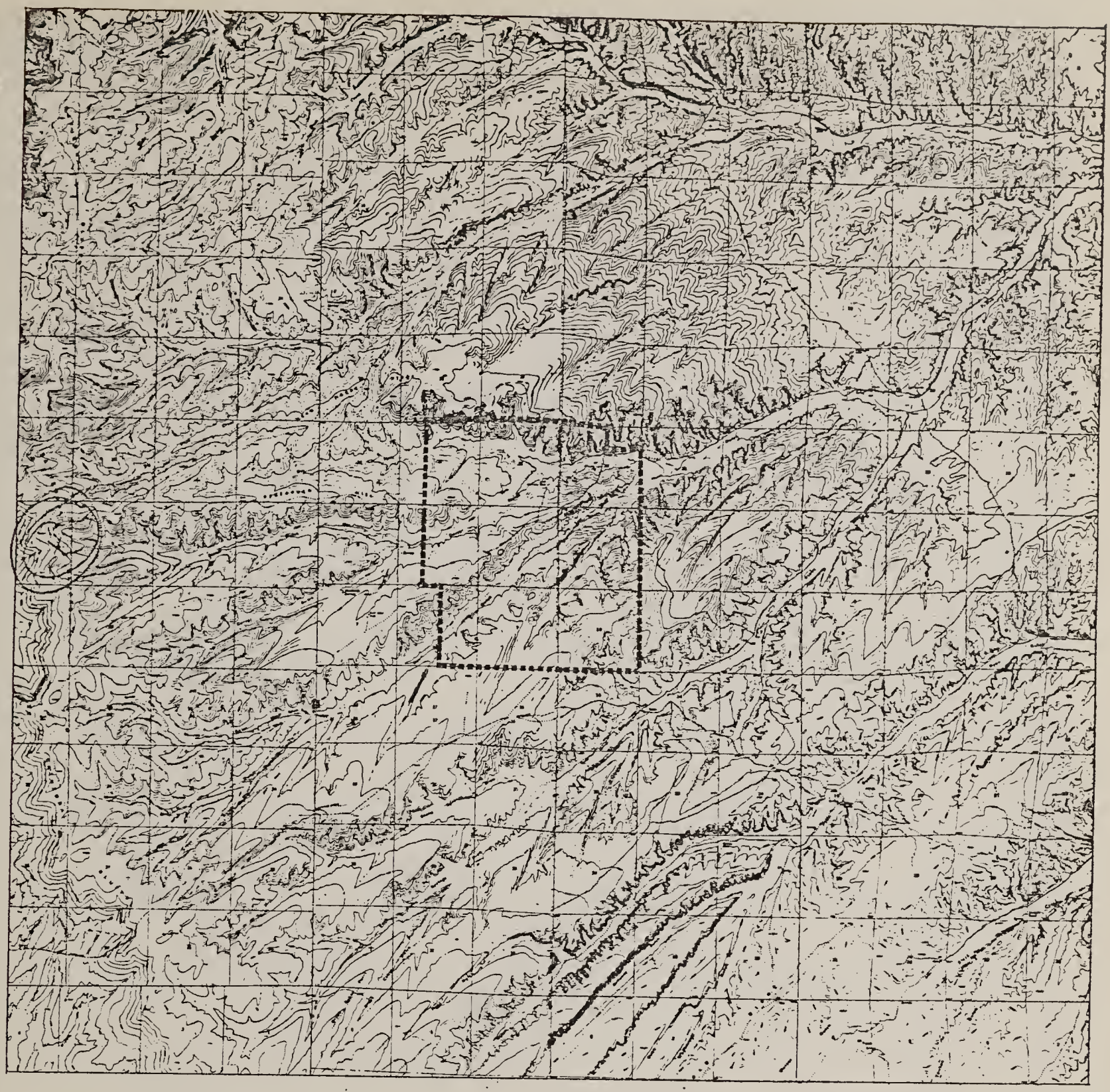
Other Information* no binoculars

Observer Maureen Baker

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.2.2-29



Species Wild Horse Date 11/11/84 Time 12:00

Means of Identification obs.

Number Observed 9 ♂ ____ ♀ ____

Adult 7 Juv. 2

Habitat upland meadow

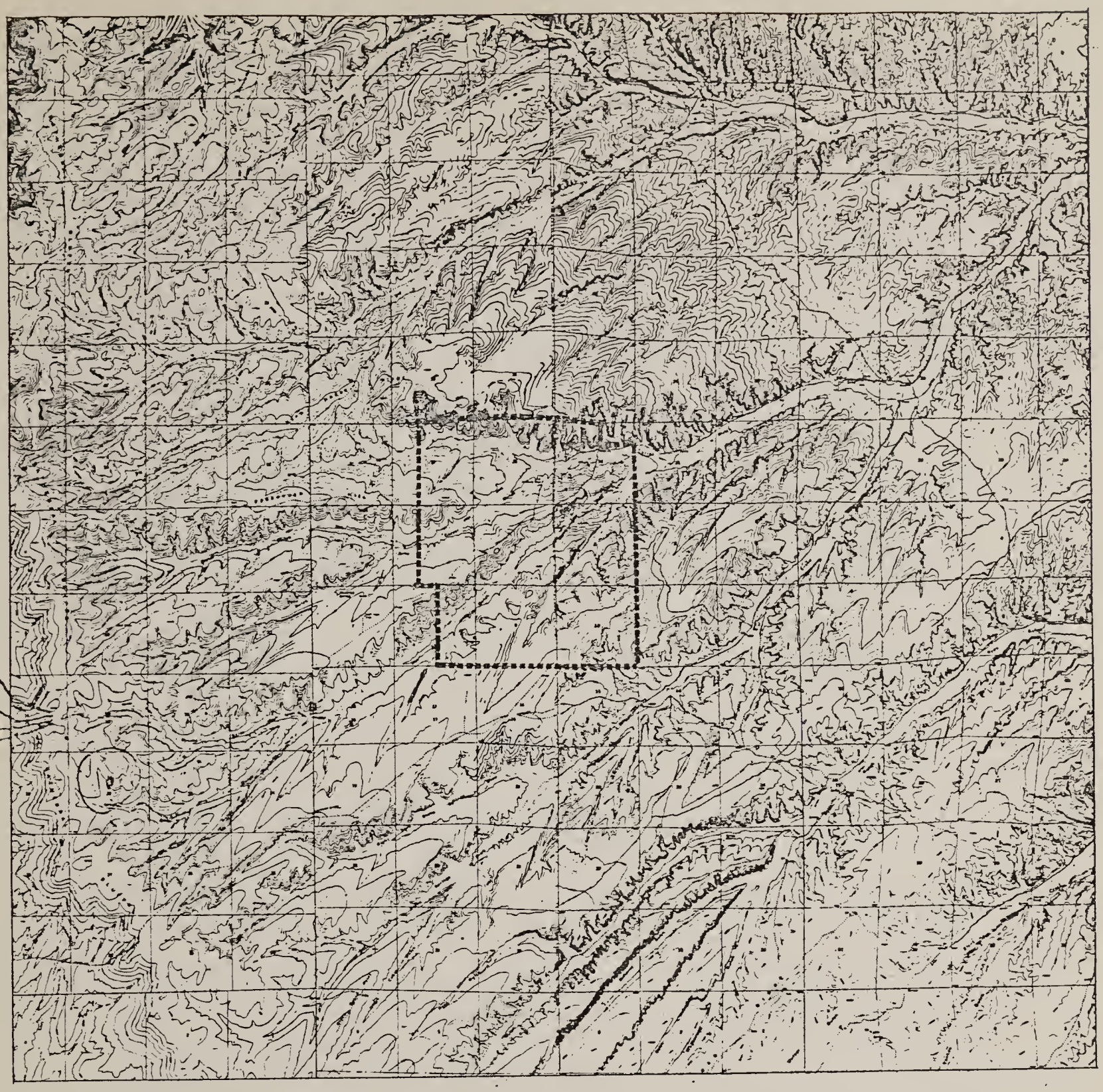
Other Information* 1 white stud w/ black tail 2 brown 4 black (1 colt)
1 gray colt + 1 gray [illegible]

Observer [illegible] Baker

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-30



Species wild horse Date 12/12/74 Time 930

Means of Identification obs

Number Observed 1 ♂ 1 ♀ _____

Adult _____ Juv. _____

Habitat upland meadow

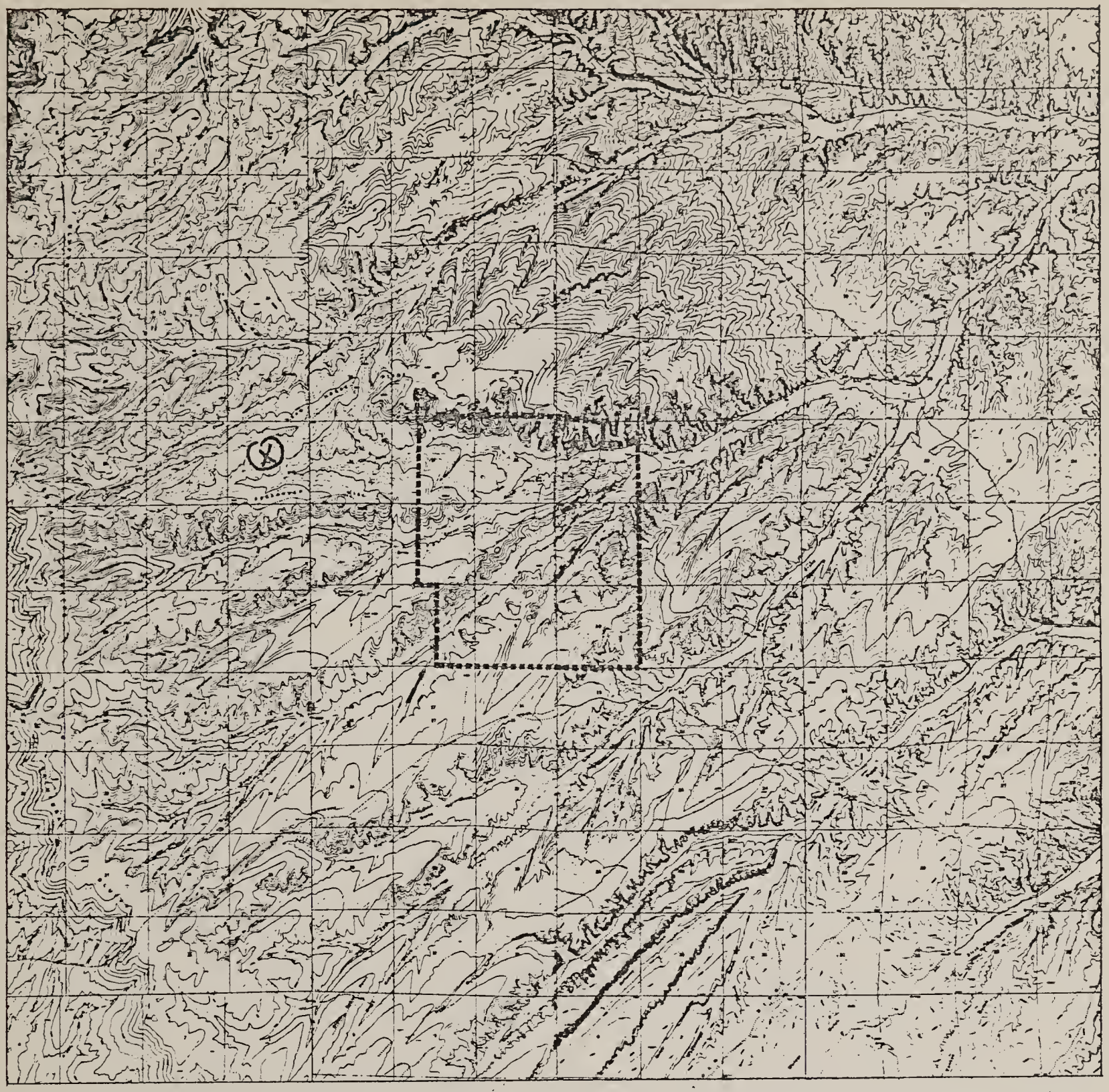
Other Information* Roan stallion w/ 5 to 6 mares & foals

Observer Turner / Ruhs

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-31



Species feral Horses Date 2-17-75 Time 1645

Means of Identification VISUAL

Number Observed 9 ♂ ♀

Adult 8 Juv. 1

Habitat SOUTH Slope pj + mtn shrub.

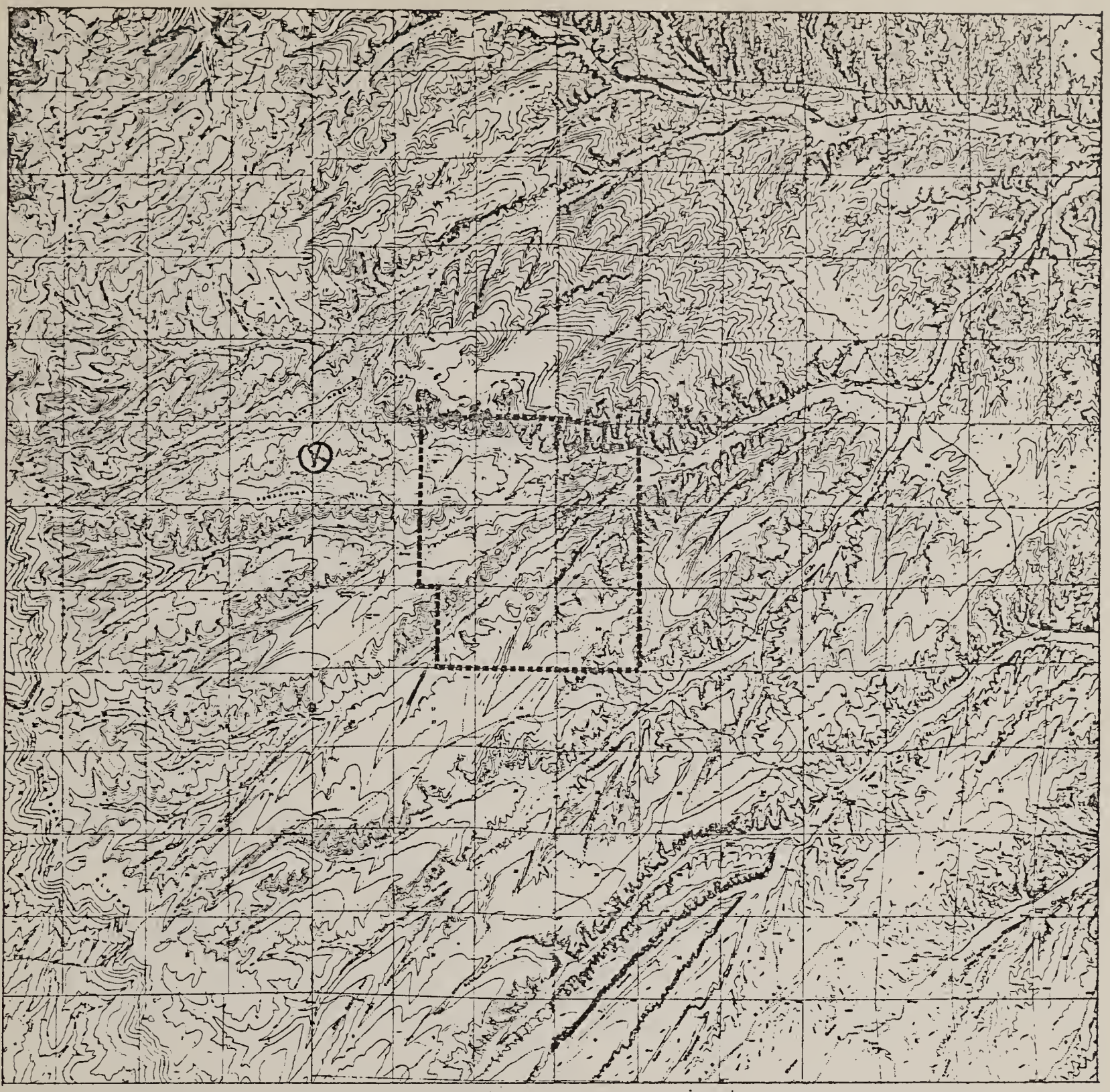
Other Information* 7 dark adult; 1 dark juv; 1 light adult. foraging west of other small herd

Observer VLT

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-32



Species Fera Horses Date 2-17-75 Time 1645

Means of Identification Visual

Number Observed 7 ♂ ♀

Adult 6 Juv. 1

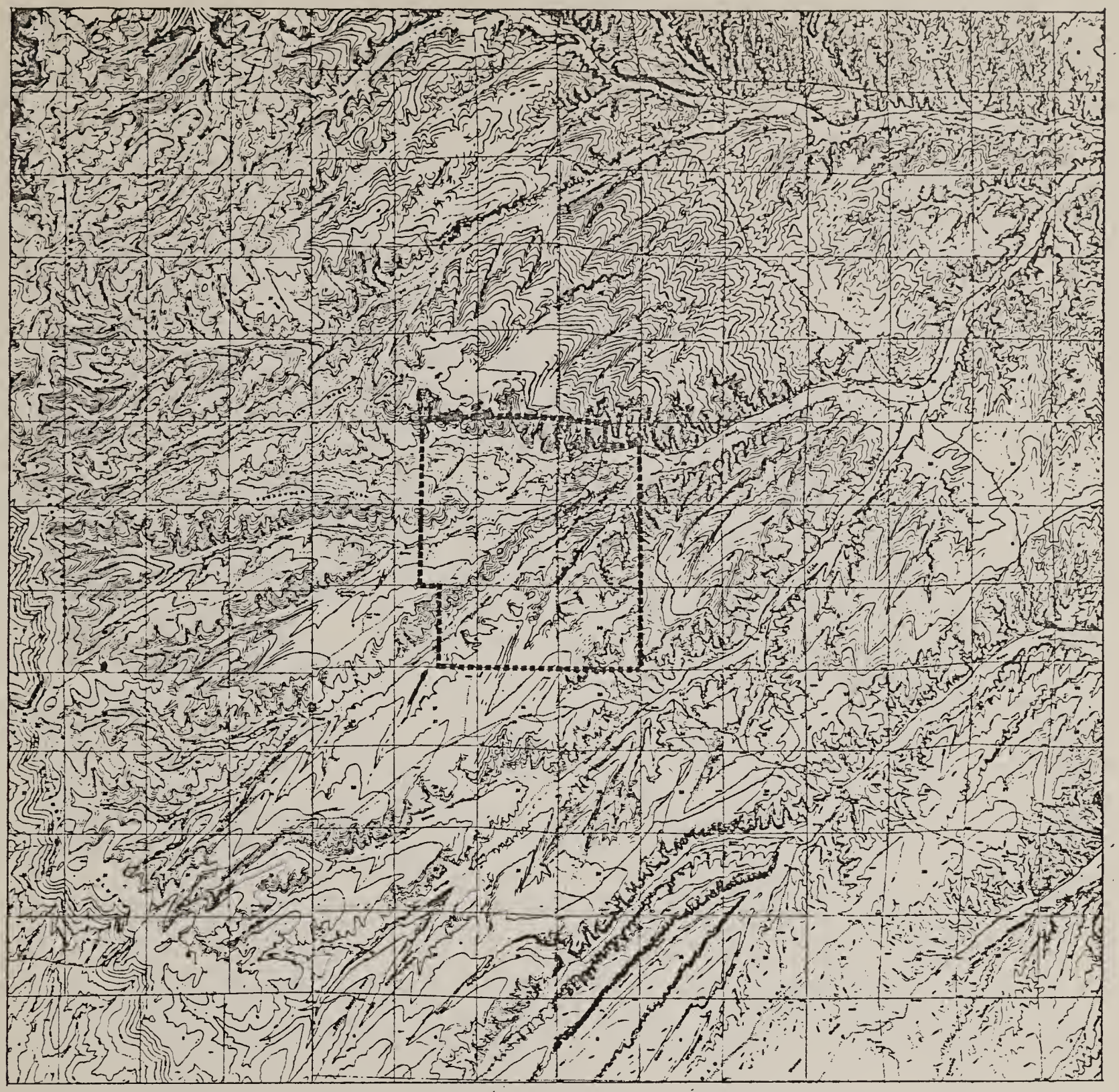
Habitat South Slope MTN shrub & P-J.

Other Information* foraging w/ Deer; coyotes howling Nearby.
6 dark adults; 1 dark juvenile. foraging east of another small herd.

Observer VH

* Include any distinguishing field marks for horses.

14.1.2-33



Species Wild Horse Date 10/10/74 Time —

Means of Identification obs

Number Observed 13 ♂ ♀

Adult 13 Juv.

Habitat Sage - Greasewood, Meadow

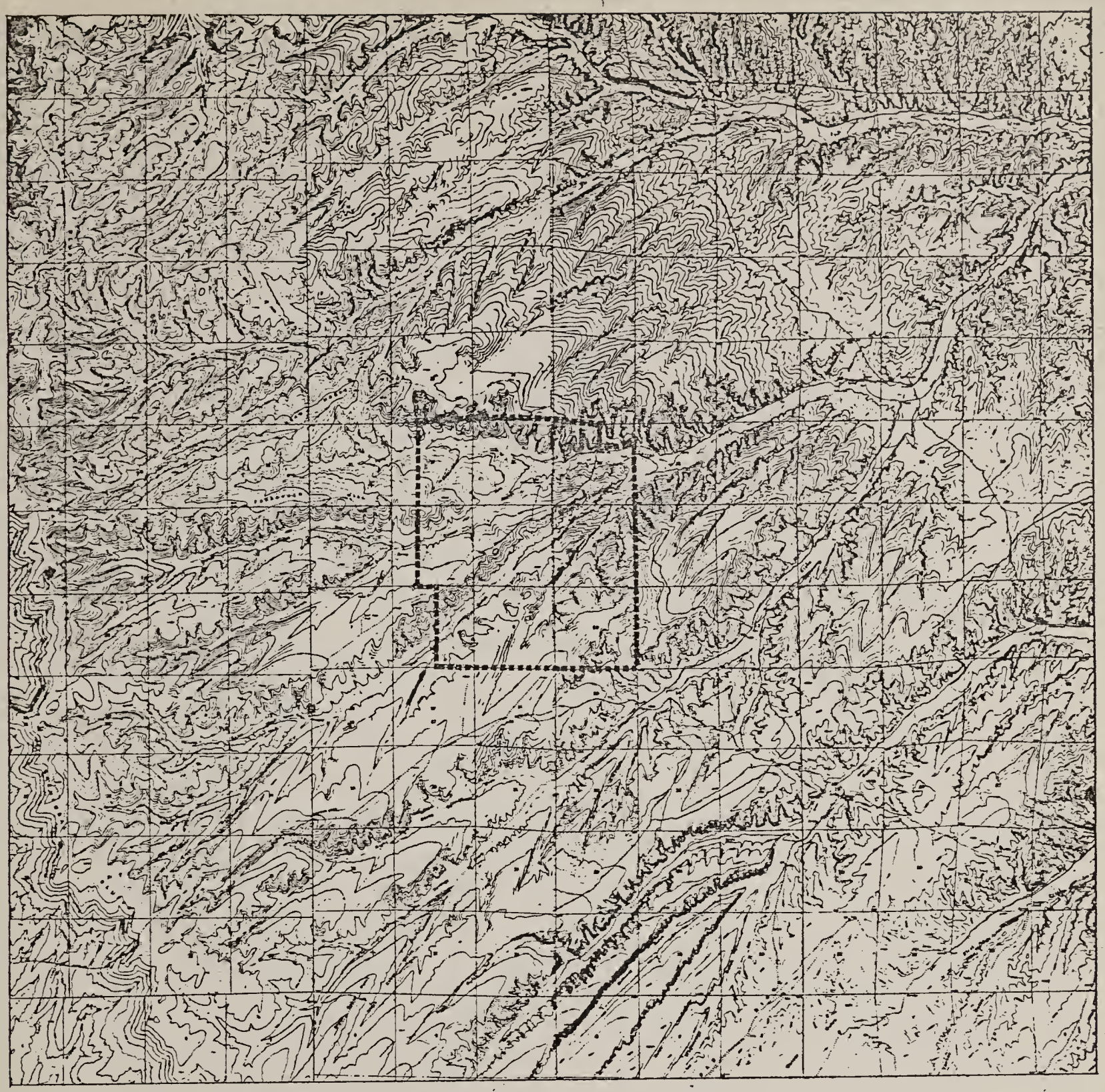
Other Information*

Observer SLE, EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-34



Species Wild Horse Date 10/10/74 Time —

Means of Identification obs

Number Observed 6 ♂ ♀

Adult 5 Juv. 1

Habitat grassy

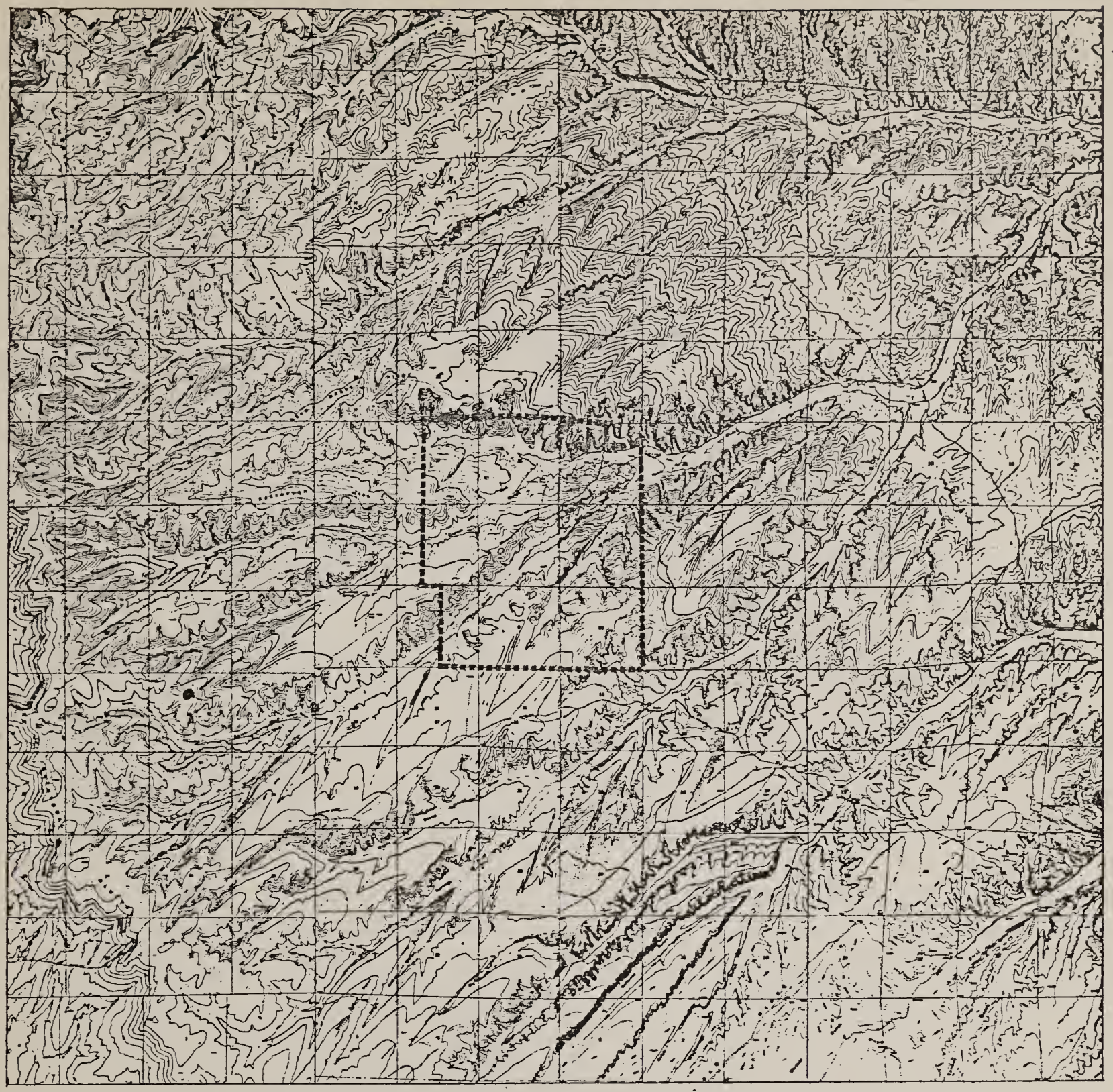
Other Information* 2 gray, 1 brown, 3 sorrel

Observer SLE, EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-35



Species Wild Horse Date 10/11/74 Time —

Means of Identification obs

Number Observed 5 ♂ ♀

Adult 4 Juv. 1

Habitat

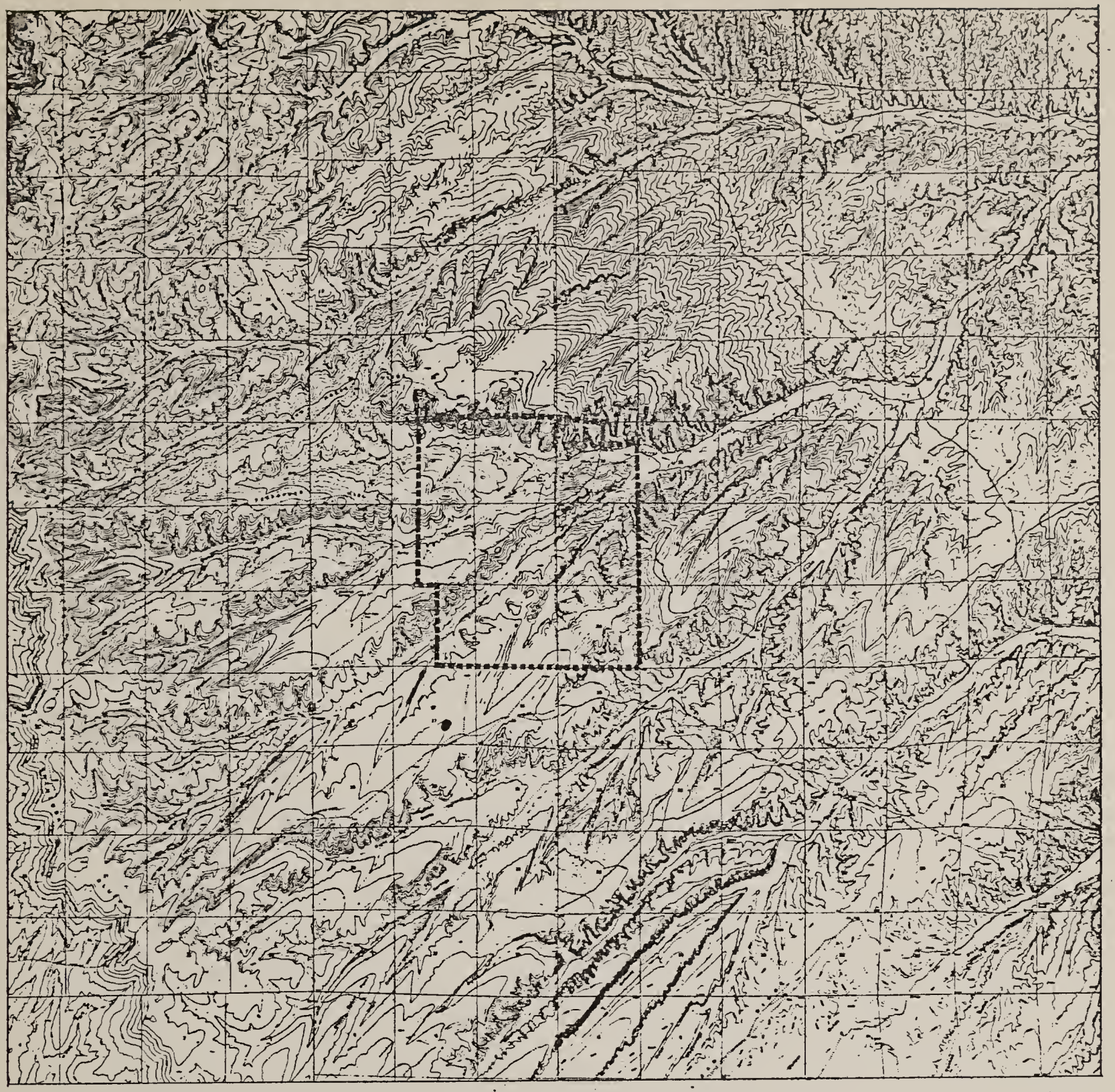
Other Information* 2 grey, 2 brown (1 colt), 1 sorrel

Observer SLE, BK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-36



Species Wild Horse Date 10/11/74 Time —

Means of Identification obs

Number Observed 9 ♂ ♀

Adult 7 Juv. 2

Habitat

Other Information* 2 white,

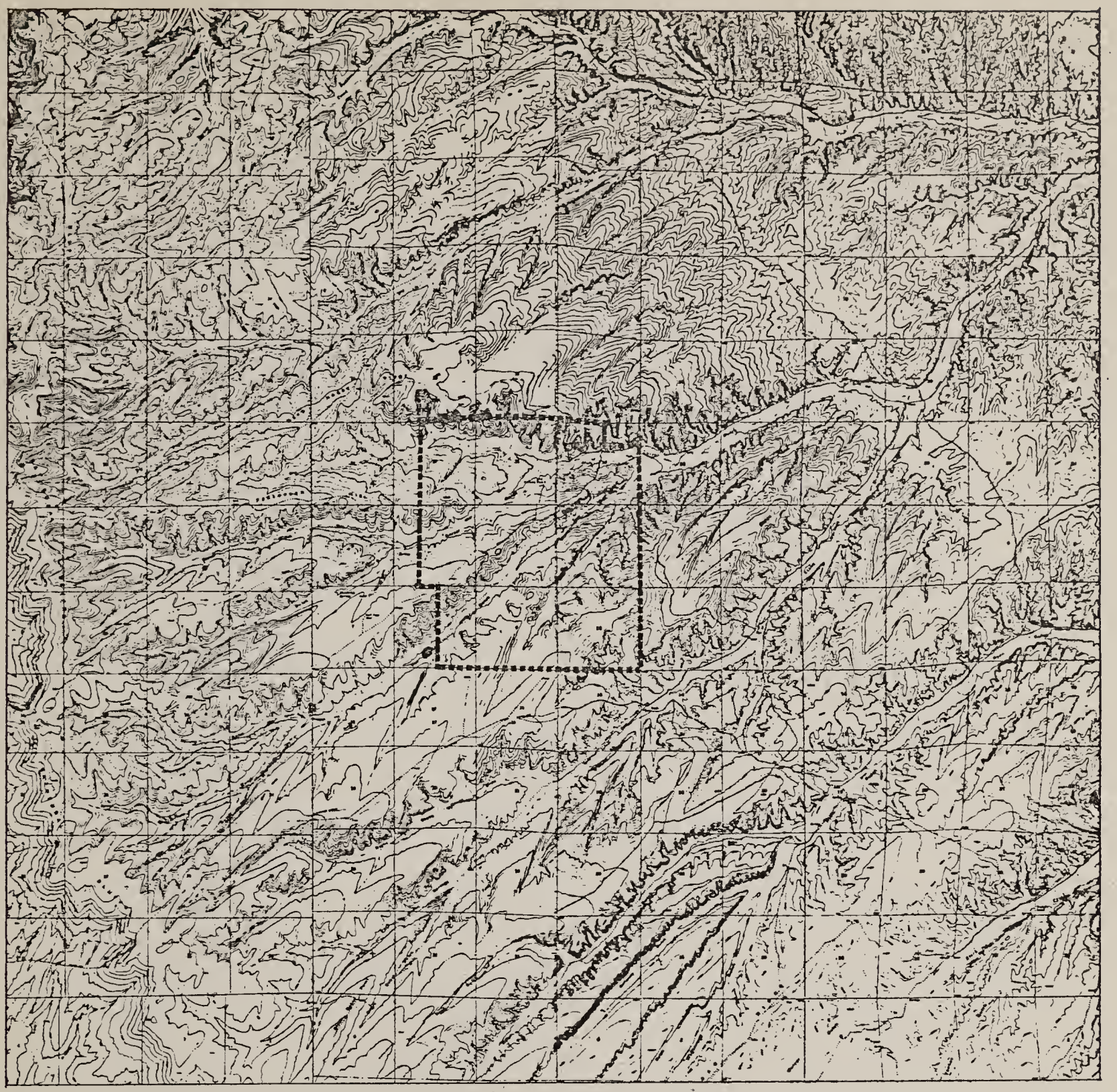
Observer SLE, EK

* Include any distinguishing field marks for horses.

3 groups in same vicinity

FIELD OBSERVATIONS

14.1.2-37



Species Wild Horse Date 10/11/74 Time -

Means of Identification obs

Number Observed 6 ♂ 1 ♀ 3

Adult 4 Juv. 2 - sex?

Habitat

Other Information* ♂ brown, ♀ - brown, black - colt, - dark brown light brown.

Observer Yen Wen, Reed

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.17-38



Species Wild Horse Date 10/11/74 Time —

Means of Identification obs

Number Observed 8 ♂ ♀

Adult 6 Juv. 2

Habitat

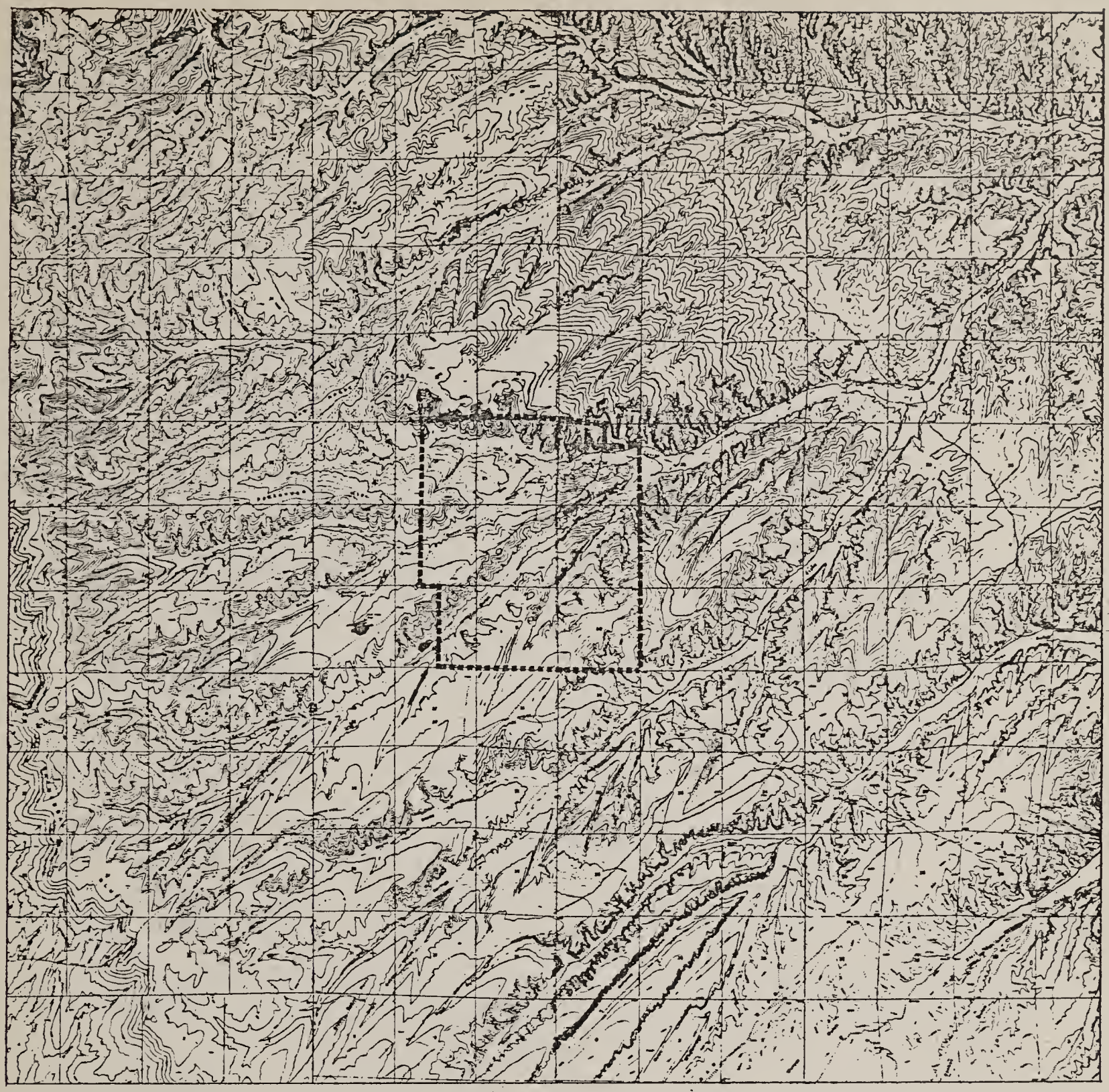
Other Information* ♀ 4 dark brown, 2 gray, colts dark brown

Observer Vern Horn, Rees

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-39



Species Wild Horse Date 10/11/74 Time —

Means of Identification obs

Number Observed 8 ♂ ____ ♀ ____

Adult 4 Juv. 4

Habitat ____

Other Information* 2 white, adult, 1 brown, 1 charcoal | 2 charcoal colts
2 chestnut

Observer Marilyn, Ross

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

H.1.2-40



Species Wild Horse Date 10/13/71 Time —

Means of Identification obs

Number Observed ? ♂ ♀

Adult Juv.

Habitat

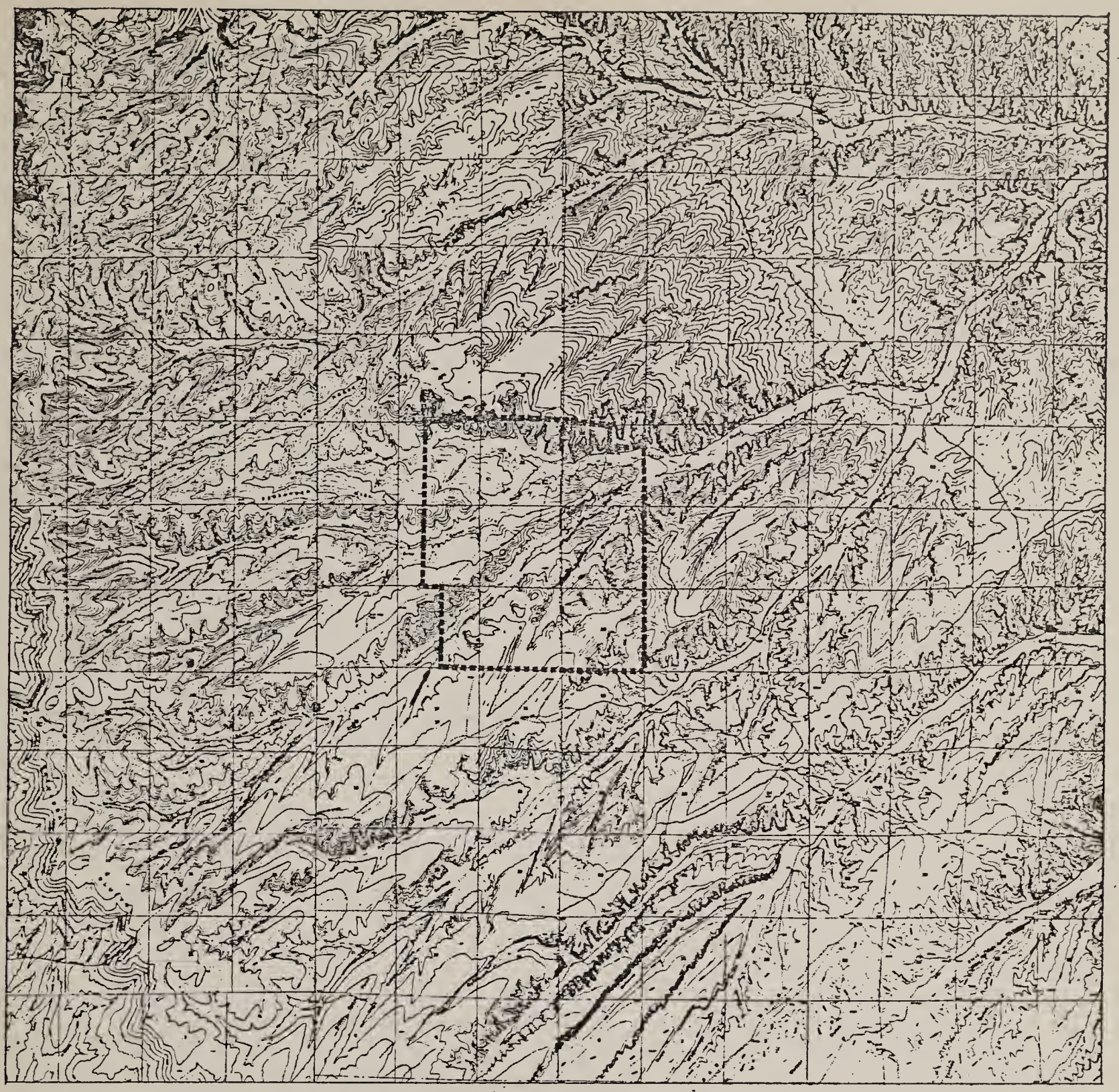
Other Information* large head

Observer Ellis Ellinwood

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.2.2-41



Species Wild Horse Date 10/13/74 Time —

Means of Identification obs.

Number Observed 1 ♂ ____ ♀ ____

Adult X Juv. ____

Habitat ____

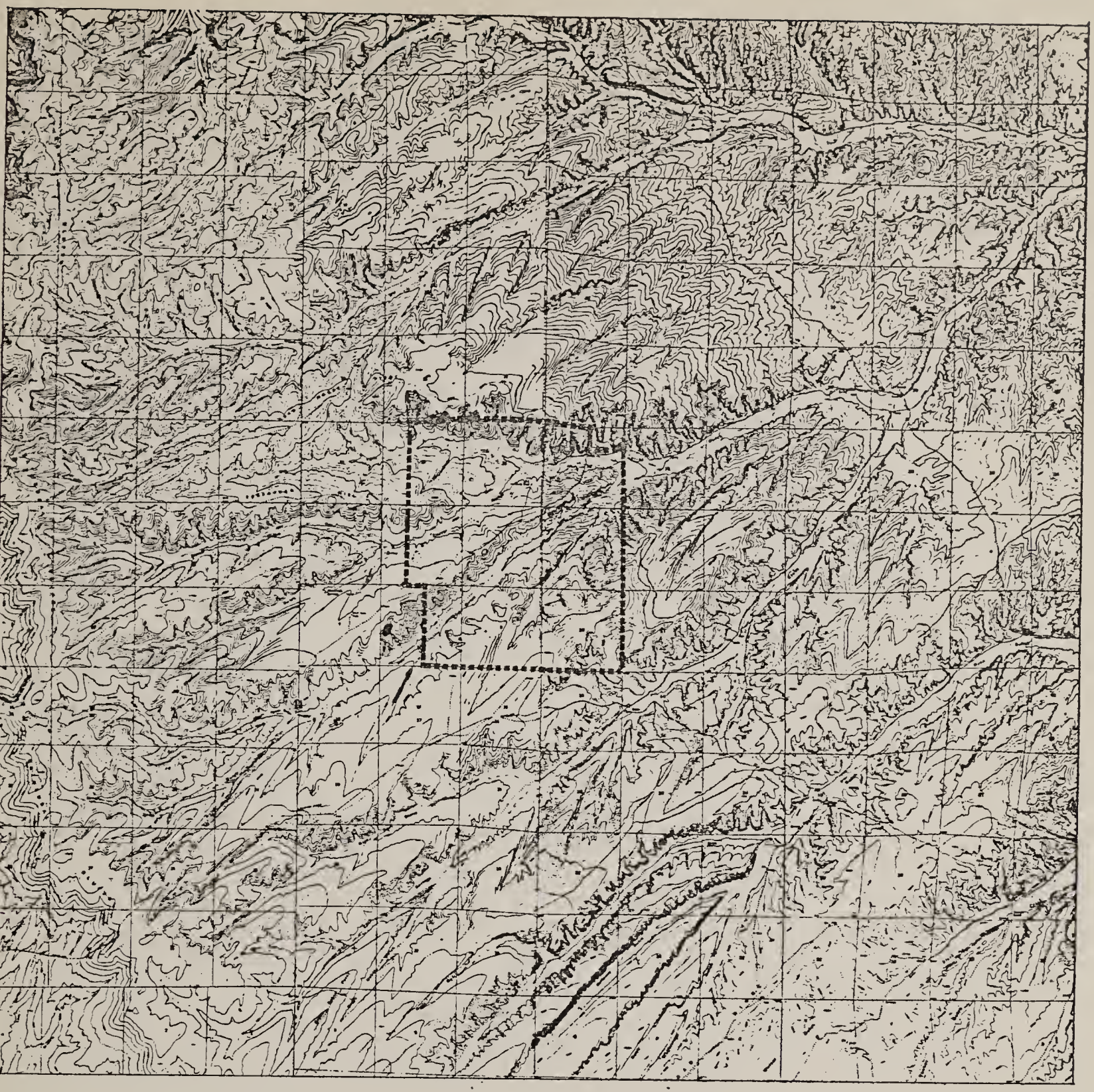
Other Information* white

Observer Ellis, Ellsworth

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.N.2-42



Species Wild Horse Date 10/14/74 Time —

Means of Identification obs

Number Observed 5 ♂ ____ ♀ ____

Adult ____ Juv. ____

Habitat ____

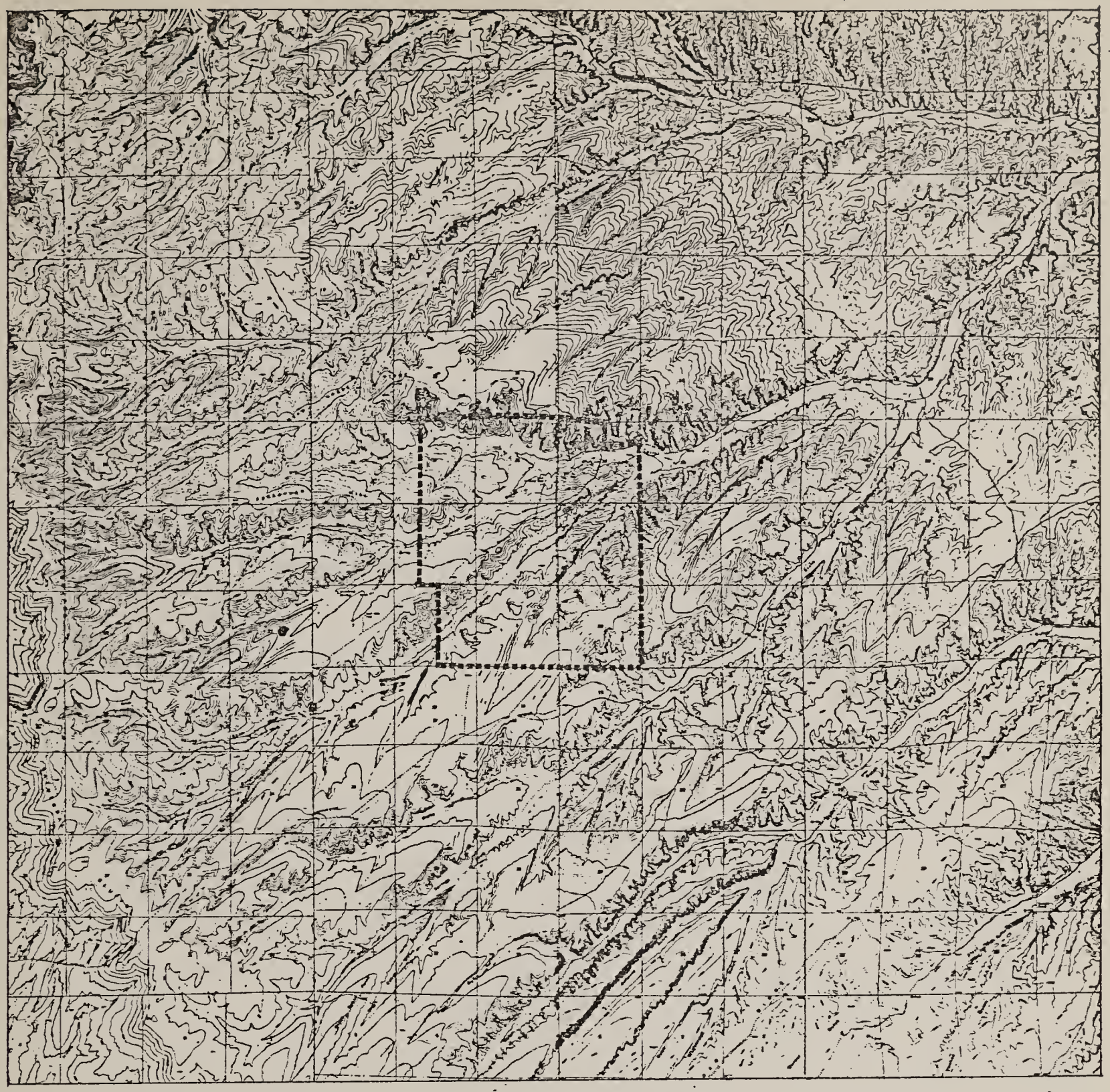
Other Information* 1 white, 1 dapple, 3 brown

Observer EK, JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.2.2-43



Species Wild Horse Date 10/14/71 Time —

Means of Identification obs

Number Observed 11 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat _____

Other Information* 1 white, 2 grey, 3 black, 5 brown

Observer RK JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-44



Species Wild Horse Date Oct. 14. 71 Time —

Means of Identification obs

Number Observed 18 ♂ ____ ♀ ____

Adult 15 Juv. 3

Habitat ____

Other Information* 3 white, 2 gray, 8 brown, 3 blacks, 2 roan

Observer JC, EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-45



Species Wild Horse Date 10/14/74 Time -

Means of Identification obs

Number Observed 6 ♂ ♀

Adult Juv.

Habitat 1

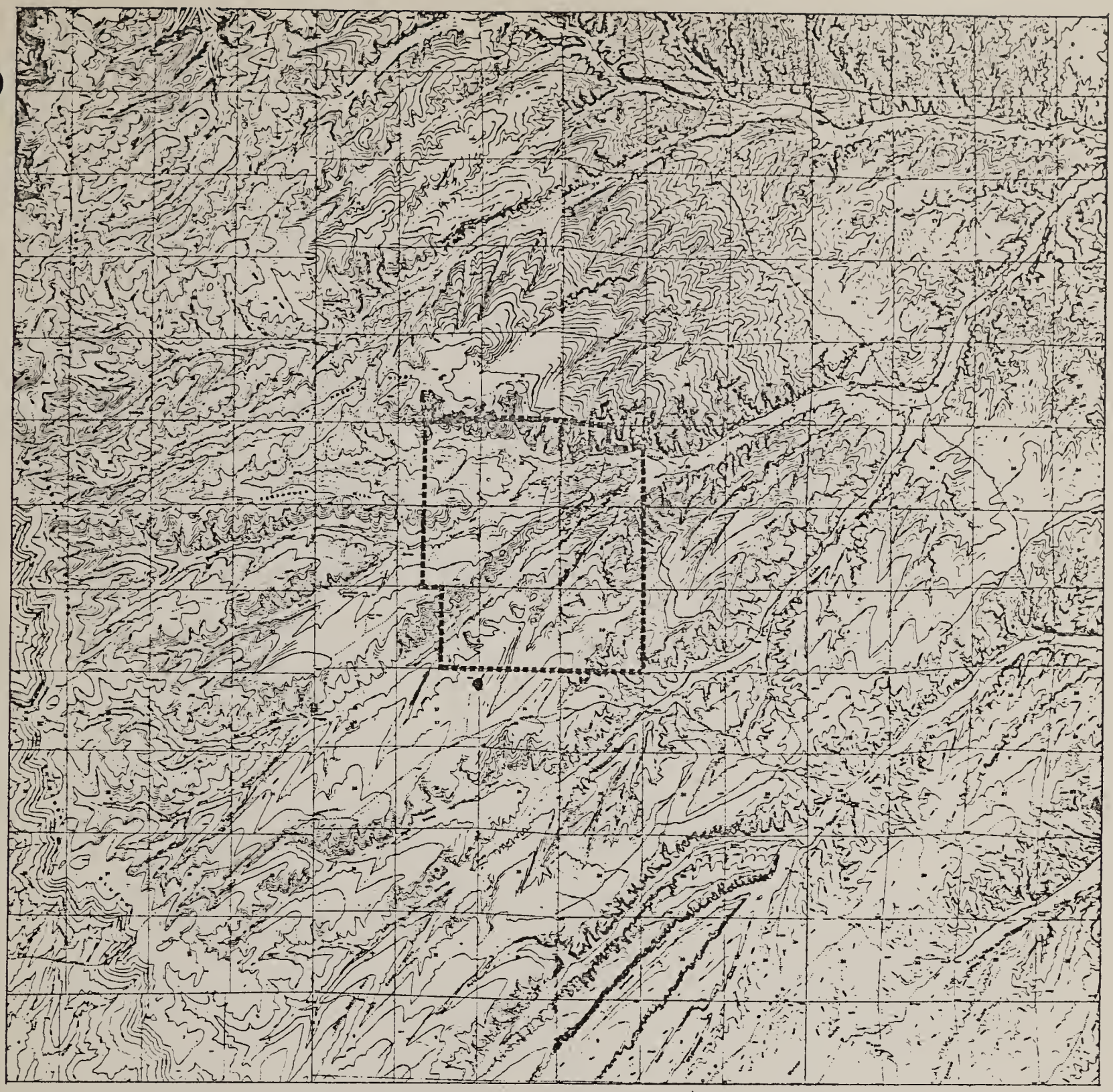
Other Information* 1 white, 1 black, 1 roan, 3 brown

Observer JC, EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-46



Species Wild Horse Date 10/15/74 Time —

Means of Identification obs

Number Observed 5 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat _____

Other Information* _____

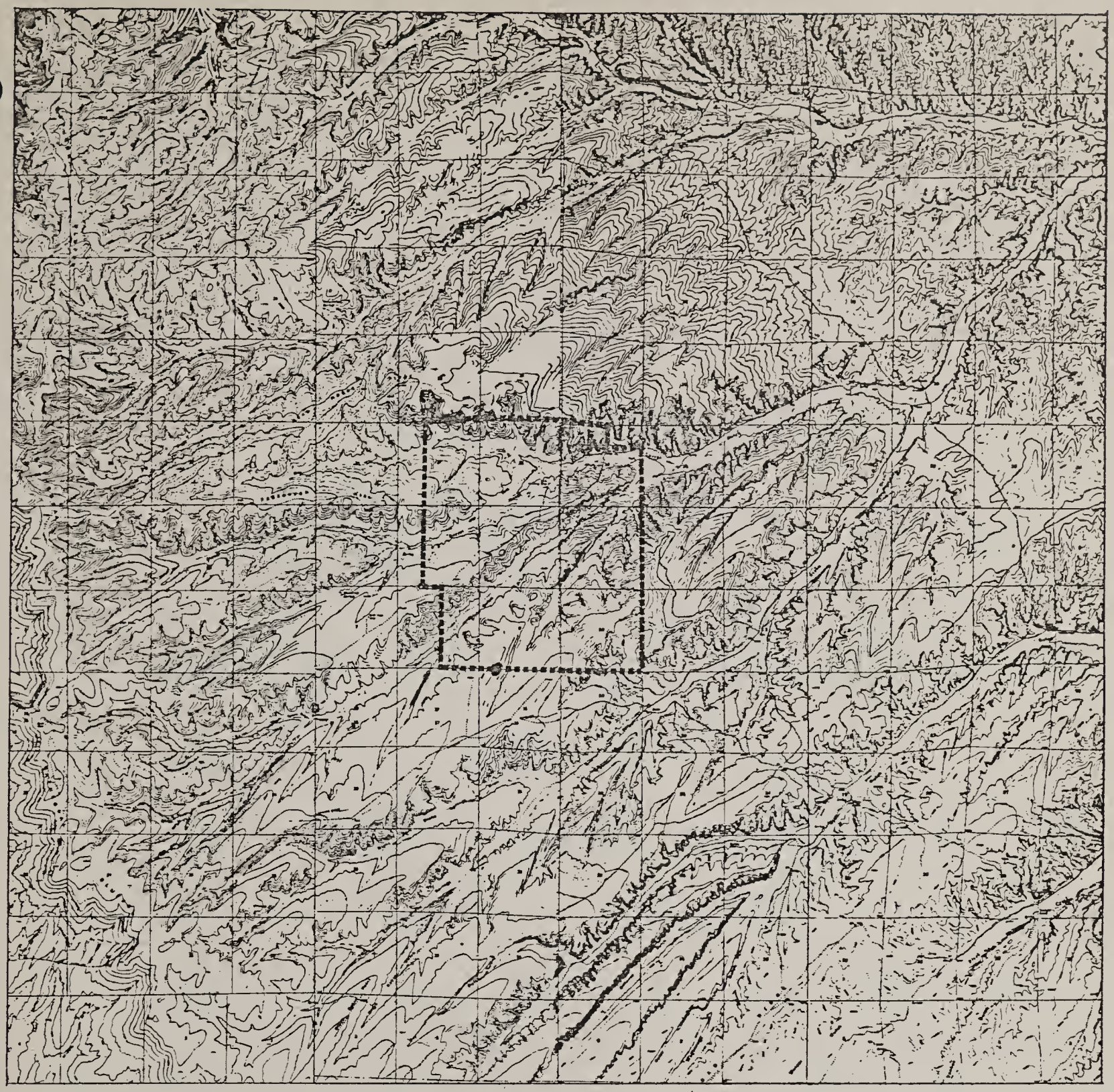
_____

Observer EK JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-47



Species Wild Horse Date 10/15/74 Time —

Means of Identification obs

Number Observed 24 ♂ ____ ♀ ____

Adult ____ Juv. ____

Habitat ____

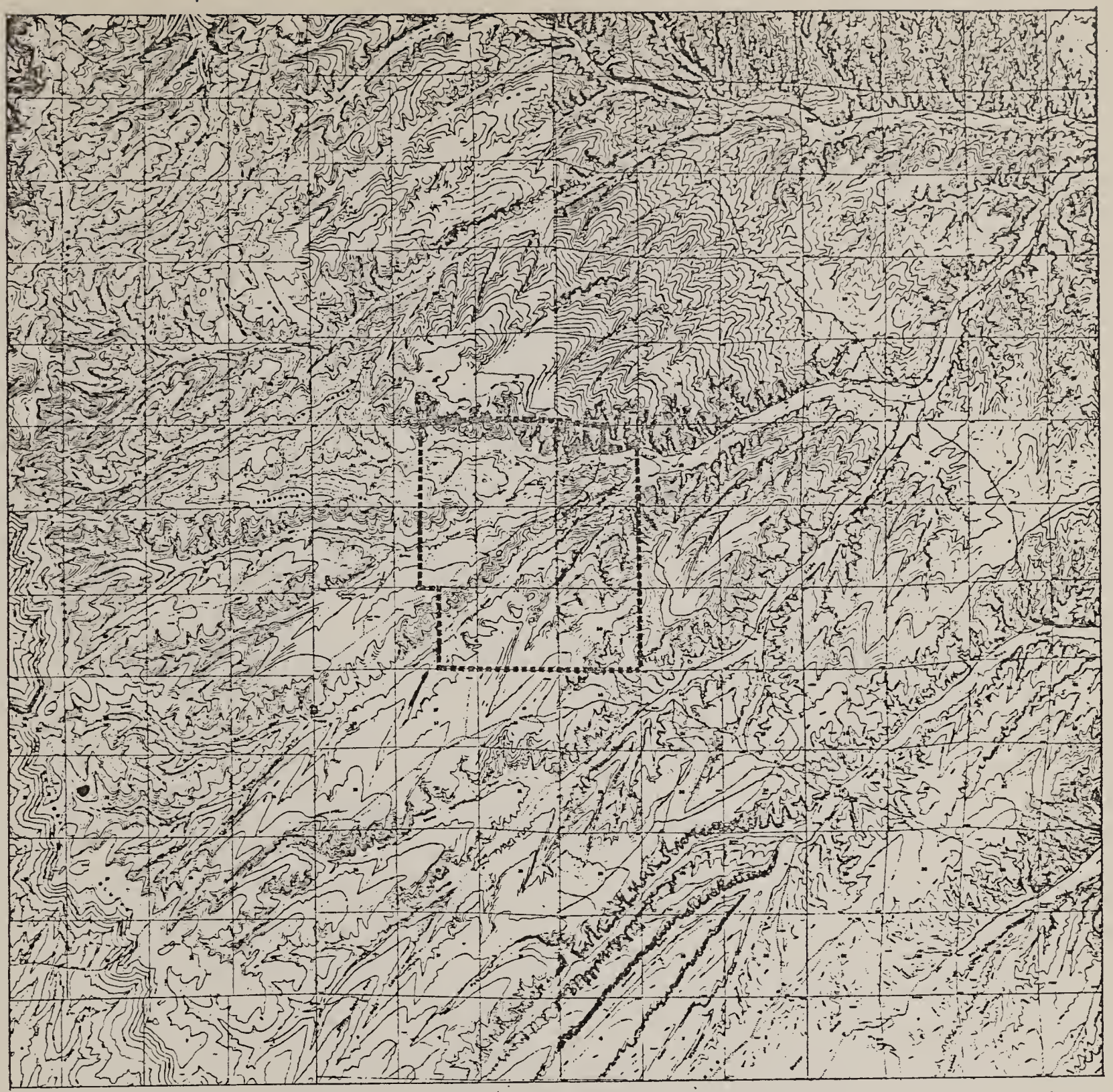
Other Information* ____

Observer EK, JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.2.2-48



Species Wild Horse Date 10/16/74 Time —

Means of Identification Obs

Number Observed 1 ♂ X ♀ _____

Adult X Juv. _____

Habitat _____

Other Information* Sorrell - E white blaze

_____

Observer JC, SE, TT

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-49



Species Wild Horse Date 10/12/74 Time -

Means of Identification obs

Number Observed 9 ♂ ♀

Adult 7 Juv. 2

Habitat wetland area - small meadow

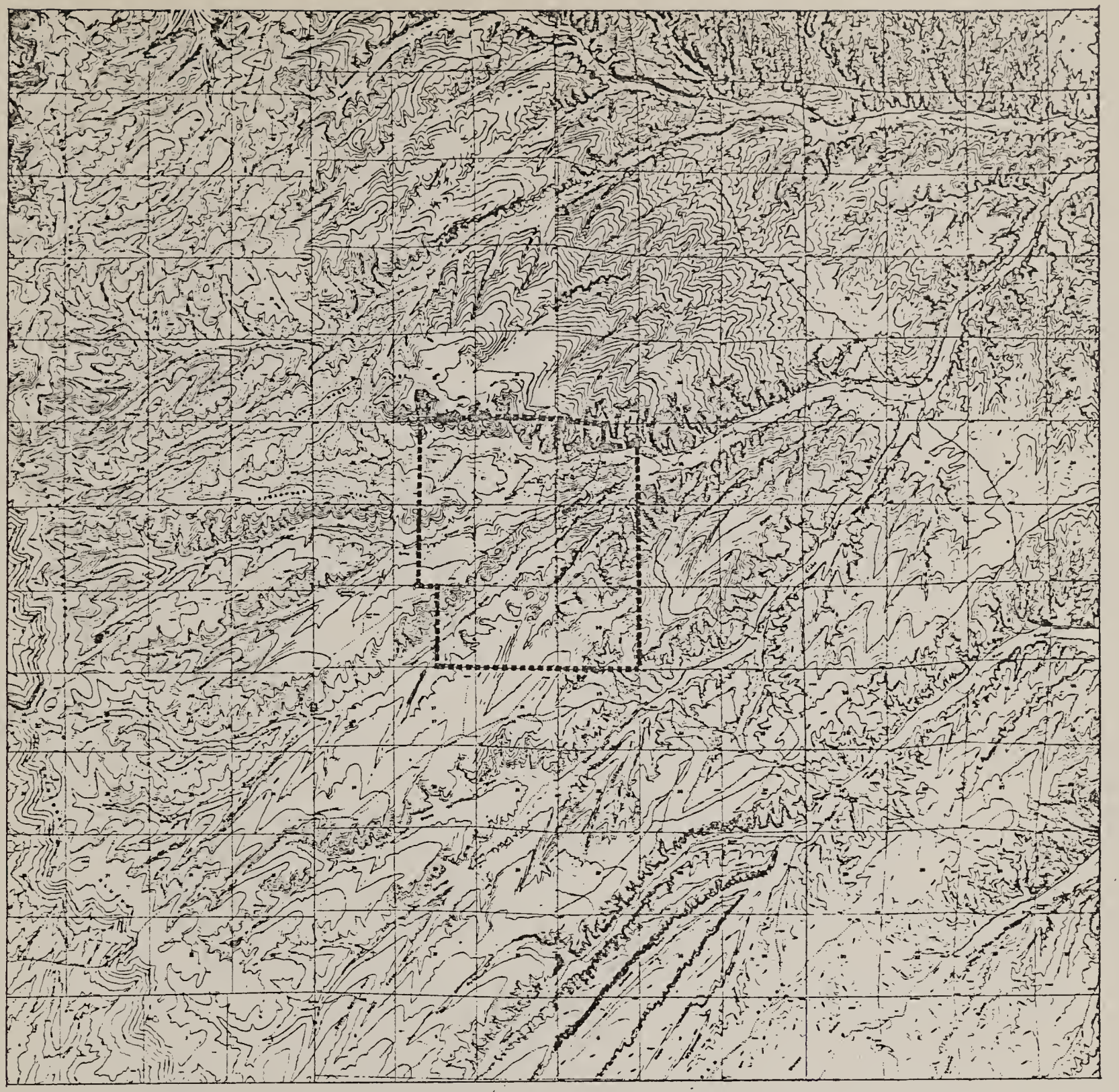
Other Information* _____

Observer JB, RJ, JE, JC

* Include any distinguishing field marks for horses.

H.1.2-50

FIELD OBSERVATIONS



Species Elk Date 10/13/74 Time —

Means of Identification obs

Number Observed 5 ♂ 2 ♀ 3

Adult _____ Juv. _____

Habitat Douglas Fir

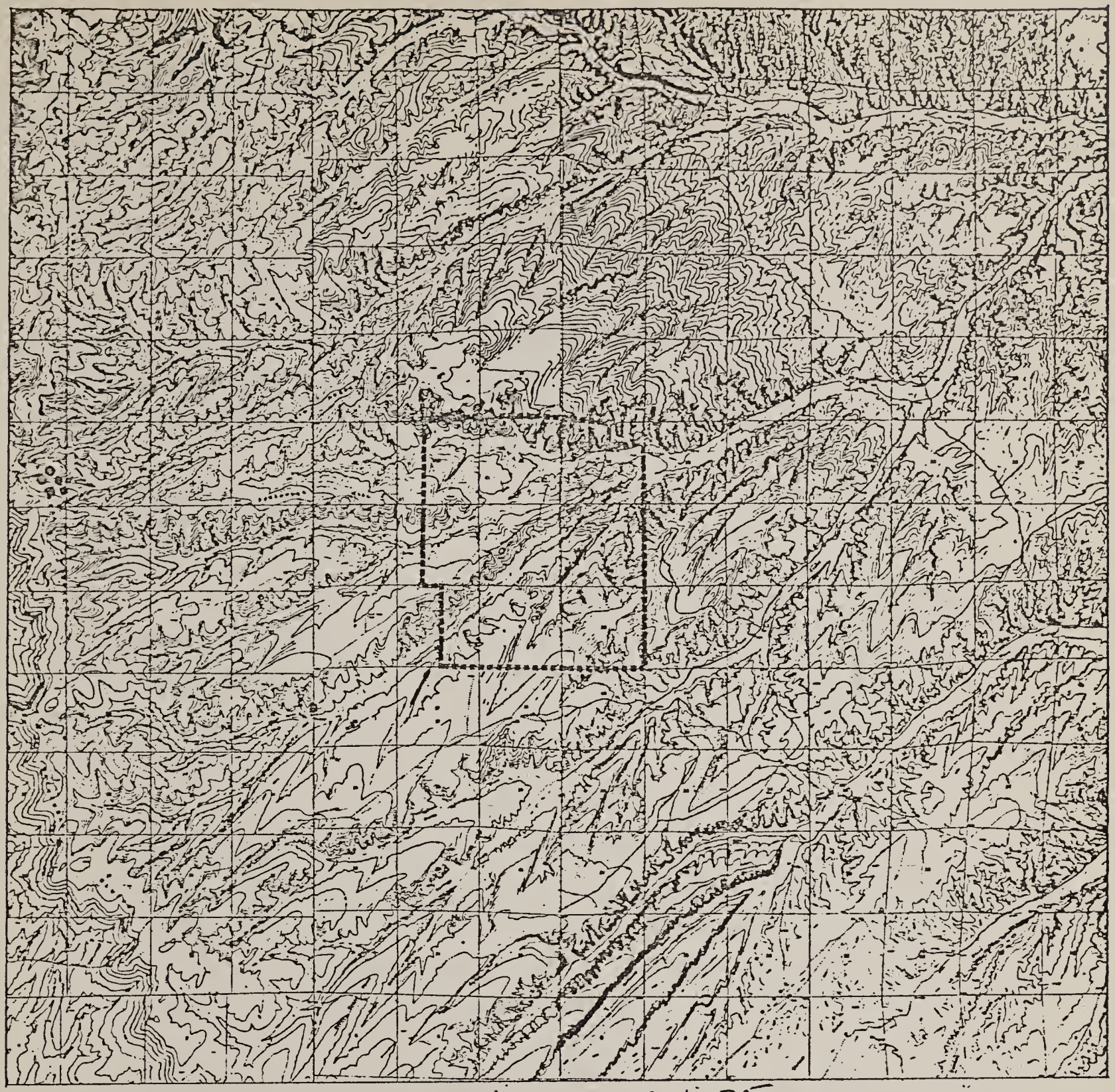
Other Information* 1 spike, 1 3-4 point bull

Observer Dan Ihorn

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.2-51



Species Elk Date ~~1-1-75~~ 2-1-75 Time 1500

Means of Identification Visual from Air

Number Observed 5 ♂ ____ ♀ ✓

Adult ✓ Juv. ____

Habitat Douglas fir

Other Information* Viewed during Aerial Raptor Censur, Transect #13; at head of Big Buck Creek

Observer Vanhoven

* Include any distinguishing field marks for horses.

2.3.5. MAMMALIAN PREDATORS

2.3.5.1. INTRODUCTION

The purpose of the mammalian predator investigations is to document the distribution and relative abundance of large predators (coyotes, bobcats, black bears and mountain lions) and small predators (ringtails, martens and weasels) within and adjacent to Tract Ca. A further objective is to determine from any records compiled by state and federal agencies, the impact these larger predators, particularly coyotes, may have on big game animals and domestic livestock in the region.

2.3.5.2. METHODS AND MATERIALS

2.3.5.2.1. Large Predators

Two census methods, the scent-station visitation technique and the siren-elicited howling response procedure are being used to gather information on large predator populations. These methods were selected after a review of the literature, and promise to yield reliable indices of large predator abundance and distribution.

Scent-Station Visitation Technique

The scent-station visitation technique was developed in New York State by Cook (1949), who suggested that records of fox sign at scent posts provided a practical index to the relative abundance of foxes between areas, and from year to year. Richards and Hine (1953) in a survey conducted to inventory foxes in Wisconsin, used a variation of this technique as did Wood (1959) in 25 counties of Florida, South Carolina and Georgia.

The method has been standardized by the Denver Wildlife Research Center (Linhart and Knowlton, 1973). In cooperation with the Division of Wildlife Services, this center has used it to survey the relative abundance of predators in 17 western states. Three hundred twenty eight scent-station lines of 50 stations each were distributed across more than 1.8 million sq mi and checked during the fall of 1972, 1973 and 1974 as part of a federal monitoring program. The results of this program are housed in ECI's library and any

further results, including statistical analyses, will be available from the Denver Wildlife Research Center. The same method will be used on and near Tract C-a so that data collected by ECI personnel will be directly comparable to data obtained by federal agencies.

The technique involves the establishment of a "survey line" consisting of 50 scent-stations spaced approximately 0.5 km (0.3 mi) apart along a 24 km (15 mi) route (Figure 29). At each station, a small perforated plastic capsule containing about 1 g of granular fermented egg attractant is positioned in the center of a circle of sifted earth 1 m (3.3 ft) in diameter. During sampling periods when snow is present, stations are placed in an unmarked patch of snow; only those tracks approaching within 1 m are recorded. The capsule is supported 1.25 - 2.5 cm (0.5 - 1 in) above the ground or snow by a thin wire rod. Stations are placed adjacent to the road edge and alternated from left to right sides of the road to reduce the influence of wind direction. Survey routes are checked daily for five consecutive days every fourth month, beginning in October 1974, and continuing through June 1976. Animal visits based on tracks are recorded for each station on a standard field data form (Figure 30).

Stations that are visited or disturbed are resifted or, in the case of snow, relocated in an unmarked area. The fermented egg attractant remains active throughout the five-day sampling period and is only replaced if rendered uneffective by wind, rain, sleet or animals (Linhart and Knowlton, 1973).

Coyote Siren Census

The siren-elicited howling response coyote census technique is being employed concurrently with the scent-station visitation technique. The former method has been tested by the Denver Wildlife Research Center (Carley, 1973) and has been used by the Oregon State Game and Fish Agency (Wolfe, 1974). The following procedures, developed by Alcorn (1971a, 1971b) of the Bureau of Sport Fisheries and Wildlife, are being used at Tract C-a. A 48 km (30 mi) transect consisting of siren stations spaced approximately 4.8 km (3 mi) apart was established along existing roads as shown in Figure 29. At each

TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

MAMMALIAN PREDATOR SAMPLING LOCATIONS

- predator scent-stations
- ▲ coyote siren census stations

R 100 W R 99 W

R 99 W R 98 W

T1S
T2S

T2S
T3S

0 1/2 1 2 miles

NORTH

ECOLOGY CONSULTANTS INC.
Fort Collins, Colorado

R. 100 W. R. 99 W.

R. 99 W. R. 98 W.

CATHEDRAL BLUFFS

HORSE RIDGE

DEAD HORSE CREEK

SAGEBRUSH HILL

3 5 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50



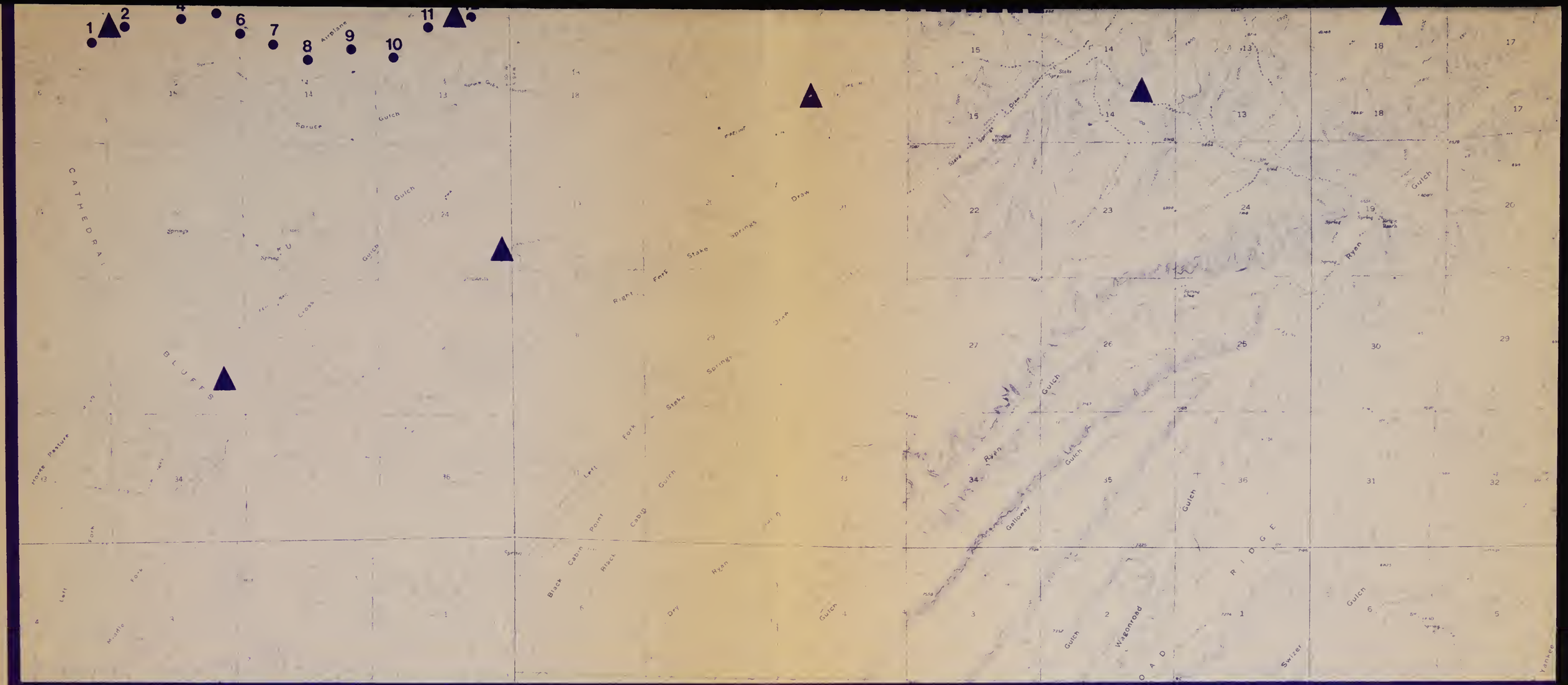
TERRESTRIAL ECOLOGICAL INVESTIGATIONS

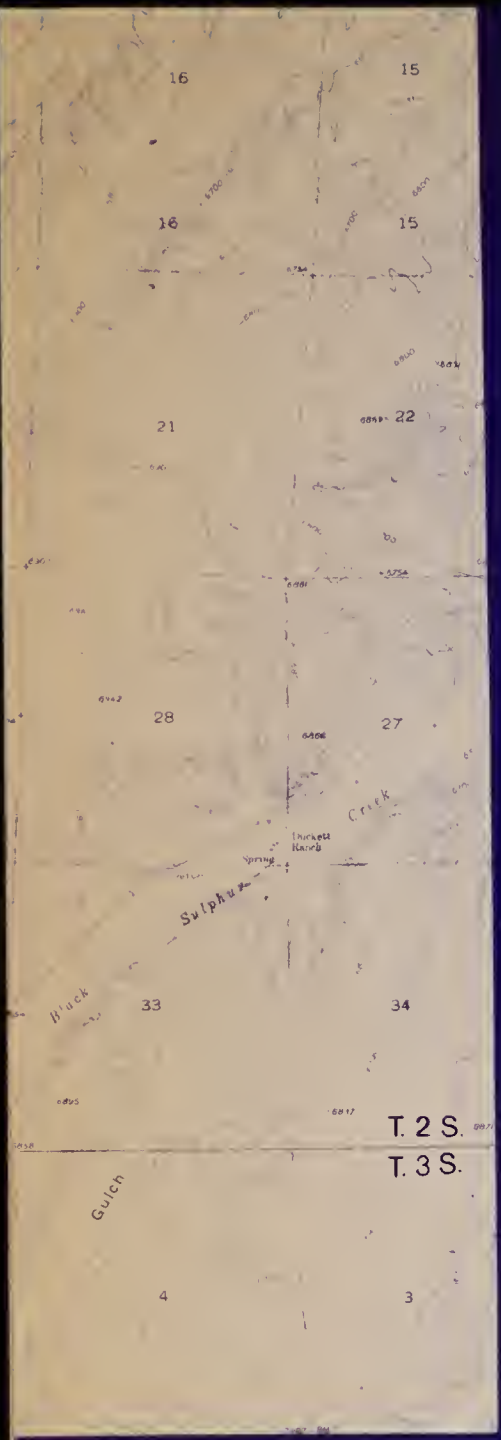
RIO BLANCO OIL SHALE PROJECT

MAMMALIAN PREDATOR SAMPLING LOCATIONS

- predator scent-stations

▲ coyote siren census stations


1
2
4
6
7
8
Airplane
9
10
11
Spruce Gulch
CATHEDRAL BLUFFS
Right Fork Stake Springs Draw
Left Fork Stake Springs Draw
Black Cabin Point Ritch Cabin Gulch
Dry Ryan Gulch
Ryan Gulch
Galloway Gulch
Wagonroad Gulch
RIDGE
Swizer
Yankee
Ryan
Gulch
Horse Pasture
Left Fork Muddy
Cross
Springs
Draw



0 1/2 1 2 miles

NORTH

ECI

ECOLOGY CONSULTANTS INC.
Fort Collins, Colorado

Figure 29. Mammalian predator sampling locations for the Rio Blanco Oil Shale Project.

PREDATOR SCENT-STATION VISITATION FIELD DATA SHEET

ecology consultants, inc.

Location _____ Proj. No. _____ Date _____ Day # _____

Investigator _____ Survey Route _____

_____ Weather _____

1	_____	26	_____
2	_____	27	_____
3	_____	28	_____
4	_____	29	_____
5	_____	30	_____
6	_____	31	_____
7	_____	32	_____
8	_____	33	_____
9	_____	34	_____
10	_____	35	_____
11	_____	36	_____
12	_____	37	_____
13	_____	38	_____
14	_____	39	_____
15	_____	40	_____
16	_____	41	_____
17	_____	42	_____
18	_____	43	_____
19	_____	44	_____
20	_____	45	_____
21	_____	46	_____
22	_____	47	_____
23	_____	48	_____
24	_____	49	_____
25	_____	50	_____

Figure 30. Predator scent-station visitation field data sheet for the Rio Blanco Oil Shale Project.

station, an electric siren is sounded for two complete pitch cycles (≈ 20 seconds), followed by a 1-minute listening period. A second two-cycle sounding of the siren is followed by a 2-minute listening period.

Data recorded on a standard form (Figure 31) includes time of soundings, response (defined as the number of groups and individuals heard) to the first sounding, response to the second sounding and total response, a simple addition of the recorded howling response during the two listening periods. Notes on conditions which might affect data such as wind, precipitation, proximity to humans, or interference by noise are also recorded. Alcorn (1971a, 1971b) and Wolfe (1974) recommend that the survey be discontinued if winds are encountered in excess of 10 mph or if precipitation occurs. Stations where there is much interference by noise are omitted from the computation of relative abundance indices. Siren sampling is accomplished after dark on two nights with suitable weather conditions during the scent-station sampling period.

Other Large Predator Investigations

Two other kinds of field evidence are being compiled on the distribution and relative abundance of large mammalian predators. During the 24 aerial censuses of big game animals in the winter months and the six summer aerial censuses of wild horses, raptors and domestic livestock, the observing biologists record and map the location of all large predators seen. Other field data result from the winter track counts and the recording of sightings of large predators on field maps (Figure 25) by personnel working in the field throughout the year. Locations of deer and livestock kills are also being noted, as is evidence of predation or carrion usage.

In conjunction with a literature review on specific information of past records of abundance and distribution of large mammalian predators in this area, State of Colorado Division of Wildlife personnel are being interviewed for records of damage claims to livestock, and for hunting kill and trapping records of predaceous mammals in the region. Government hunters from the Bureau of Sport Fisheries and Wildlife who have been taking coyotes in western Colorado from helicopters, are also being contacted for specific information on large predators in the Piceance Basin.

SIREN-ELICITED HOWLING RESPONSE

Location_____ Project No._____ Date_____ Investigators_____

Survey Route_____ Weather_____

Station Number	Time	Response to First Sounding		Response to Second Sounding		Total Response		Notes on conditions affecting data; wind; proximity to humans, etc.
		Groups	Individual	Groups	Individual	Groups	Individual	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

2.3.122

Figure 31. Coyote siren response field data sheet for the Rio Blanco Oil Shale Project

2.3.5.2.2. Small Predators

Havahart live traps using baiting material deemed appropriate by a review of the literature are being routinely set during small mammal, mammalian predator and winter track count sampling conducted in every major habitat type in the study area. All traps are checked daily; any animal captured is identified to species and sex, and released. Location of captures, sightings by field personnel, scats, dens, and other definitive signs are carefully plotted on field maps (Figure 25). Compilation of all maps aids in determining the distribution of small mammalian predators within and adjacent to Tract C-a.

2.3.5.3. RESULTS AND DISCUSSION

The mammalian predator scent-station survey was conducted from November 11 through 15, 1974 and repeated during the week of February 10 through 14, 1975. The initial scent-station survey was scheduled for late October, 1974 but was delayed to prevent interference from the large number of deer hunters in the area at that time. The siren-elicited howling response method as a coyote census technique was employed concurrently with the predator scent-station method on two nights of suitable weather conditions during each 5-day sampling period. The specific dates of the siren census were November 11 and 13, 1974 and then again February 10 and 12, 1975.

The results of the predator scent-station technique and the corresponding relative abundance indices for both sampling periods are summarized in Table 19, and the results of the siren-elicited howling response technique are presented in Table 20.

Scent-Station Visitation Technique

The coyote relative abundance index of 18.75 calculated from the results obtained during the November, 1974 scent-station visitation sample appear to be quite low, both in relation to the February, 1975 index of 78.31 and the state average reported for 1973 of 136.2 (USDI, 1973a). Data recorded by federal agencies for 1974 are not yet available but comparisons will be made as soon as they are.

Table 19. Scent-station visitation technique results and relative abundance indices as calculated from data collected during November 11-15, 1974 and February 10-14, 1975 for the Rio Blanco Oil Shale Project

Sample 1 - November 11-15, 1974							
Night:	1	2	3	4	5	Total	Rel. Abun. Index[1/]
Operable station nights:	48	42	42	42	37	211	
Visits by species:							
Coyote (*Canis latrans*)	-	-	2	1	1	4	18.95
Long-tailed weasel (*Mustela frenata*)	2	1	-	-	-	3	14.21

Sample 2 - February 10-14, 1975							
Night:	1	2	3	4	5	Total	Rel. Abun. Index
Operable station nights:	22	30	45	46	23	166	
Visits by species:							
Coyote (Canis latrans)	2	1	4	2	4	13	78.31
Long-tailed weasel (*Mustela frenata*)	1	-	-	1	-	2	12.04

[1/] $\frac{\text{Total number of visits by species}}{\text{Total number of operable station sites}} \times 1000$

Table 20. Coyote siren census results and station and group response indices calculated from data collected November 11 and 13, 1974 and February 10 and 12, 1975 for the Rio Blanco Oil Shale Project

Sample 1 - November 11 and 13, 1974

No. of Stations	No. of Response Stations	No. Responding Groups	Station Response Index[1/]	Group Response Index[2/]
15	10	13	66.66	86.66

Sample 2 - February 10 and 12, 1975

No. of Stations	No. of Response Stations	No. Responding Groups	Station Response Index	Group Response Index
11	7	10	63.63	90.91

1/ Station Response Index = $\frac{\text{Total number of stations with response}}{\text{Total number of stations}}$

2/ Group Response Index = $\frac{\text{Total number of groups responding}}{\text{Total number of stations}}$

An explanation for the low level of response in the November, 1974 sample may be that the sampling period immediately followed a two-week deer hunting season. There are two reasons that such a condition might affect scent-station data: 1) The animals would probably be more wary following a period of human activity, especially one which included firearms; and 2) The animals would be less likely to roam in search of food due to the availability of camp refuse, viscera from hunter kills and the easy prey afforded by wounded deer (R. Kraiger, Colorado Division of Wildlife's Little Hills Experimental Station, personal communication).

To avoid this problem in the future, the fall sample for 1975 will be conducted during October prior to the deer hunting season.

Coyote Siren Census

Results of the siren-elicited howling response census are quite similar for the two samples taken thus far. This technique appears to be working satisfactorily and should prove valuable as an indicator of relative abundance over a period of time. The similar nature of the results obtained with this method serve to support the hypothesis that coyote numbers were not reduced in November, 1974 as indicated by the scent-station census but that the animals were less inclined to approach scent-stations immediately following the deer season.

2.3.5.4. SUMMARY AND CONCLUSIONS

Records of tracks, scats and other definitive sign recorded by ECI personnel on and near Tract C-a as well as the results of the scent-station visitation census indicate that the coyote (Canis latrans) and the long-tailed weasel (Mustela frenata) are the two most abundant mammalian predators in the area. The long-tailed weasel has been the only animal captured as part of the live-trap program outlined in the methodology section. A review of the literature (Lechleitner, 1969; Anderson, 1972) indicates that the ermine or short-tailed weasel (Mustela erminea) may also be present in the area but actual observation or capture has yet to bear this out.

Other mammalian predators that have been documented by tracks and direct observation on the site are the bobcat (Lynx rufus) and the badger (Taxidea taxus), respectively. Further terrestrial investigations should yield additional species.

IV. MAMMALIAN PREDATORS

A. Scent Station Visitation (7.1.2)

B. Coyote Siren Cenusus (7.1.2)

C. Distribution Records (14.1.3)

PREDATOR SCENT-STATION VISITATION FIELD DATA SHEET

ecology consultants, Inc

Location Rio Blanco Proj. No. 83 Date 11/11 - 11/15/74 Day # —

Investigator Sanz, Turner Survey Route Cathedral Bluffs →

Corral Gulch → 84 Duck Sprgs Rd. Weather —

LIST OF HABITAT TYPE BY STATION

1	upland meadow	26	sage / mt. brush / P.J.
2	" "	27	Rabbitbrush
3	" "	28	sage
4	mt. brush - sage	29	"
5	" " "	30	"
6	upland meadow	31	"
7	" "	32	Rabbitbrush
8	mt. brush - sage	33	sage
9	" " "	34	"
10	sage	35	"
11	mt. brush - sage	36	"
12	sage	37	"
13	"	38	"
14	"	39	"
15	"	40	"
16	PJ / mt. brush	41	cliff
17	sage	42	sage
18	PJ	43	low sage
19	sage	44	" "
20	"	45	" "
21	PJ / sage	46	" "
22	PJ	47	" "
23	PJ / sage	48	" "
24	PJ	49	" "
25	PJ / sage	50	" "

PREDATOR S[illegible]T-STATION VISITATION FIELD DAT[illegible] SHEET

7.1.2-2

ECI ecology consultants, Inc.

Location Rio Blanco Proj. No. 83 Date 11/11/74 Day # 1

Investigator Sanz, Turner Survey Route Cathedral Bluffs →

Corral Gulch → 84 Duck Spgs Rd. Weather Clear / Cold

1	—	26	—
X	inoperable (wind)	27	mouse
3	—	28	—
(4)	weasel	29	chipmunk
5	—	30	chipmunk
6	—	X	chipmunk
7	deer	32	—
8	—	33	mouse
9	mouse	34	—
[illegible]	mouse	35	—
11	—	36	—
12	chipmunk	37	mouse, deer
13	chipmunk	(38)	weasel
14	—	39	—
15	mouse	40	chipmunk
16	—	41	mouse, chipmunk
17	—	42	chipmunk
18	chipmunk, mouse	43	—
19	cow, chipmunk	44	—
20	mouse	45	chipmunk
21	mouse	46	—
22	mouse	47	cow
23	—	48	—
24	mouse	49	chipmunk
25	—	50	chipmunk

PREDATOR S' 'T-STATION VISITATION FIELD DAT' SHEET 7.1.2-3 (ECI) ecology consultants, Inc

Location Rio Blanco Proj. No. 83 Date 11/12/74 Day # 2

Investigator Turner, Sanz Survey Route same as day #1

Weather Partly cloudy ≈ 50°

X	inoperable, unable	26	
X	to check due to	27	deer
X	road conditions	28	deer
X		29	chipmunk
X		30	
X		31	chipmunk
7		32	
8		33	
9		34	
10		35	
11		36	mouse
12	deer, chipmunk	37	
13		(38)	weasel
14		39	
15		X	inoperable, humen interference
16		41	chipmunk
17		42	chipmunk
18		43	mouse
19		44	deer
20		45	chipmunk
21		46	
22		47	cow
23		48	
24	mouse	49	chipmunk
25		50	chipmunk

PREDATOR S' 'T-STATION VISITATION FIELD DAT SHEET

7.1.2-4 (ECI) ecology consultants, Inc

Location Rio Blanco Proj. No. 83 Date 11/13/74 Day # 3

Investigator Turner, Sanz Survey Route same as day # 1

Weather cloudy, cold

X inoperable because
X of crusted snow
X during the night-
X time hours
X
X
X
8 chipmunk
9 —
10 —
11
12 —
13 —
14 —
15 —
16 —
(17) coyote
18 —
19 chipmunk
20 —
21 —
22 chipmunk, mouse
23 mouse
24 mouse
25 cottontail
26 —
27 chipmunk
28 mouse
29 mouse
30 mouse
X chipmunk (near drill rig)
32 —
33 —
34 —
35 chipmunk
36 cow, mouse
37 chipmunk
38 mouse
39 —
40 —
41 chipmunk
42 chipmunk
43 mouse
44 —
45 —
46 —
47 —
(48) coyote
49 cow
50 —

PREDATOR S' 'T-STATION VISITATION FIELD DAT SHEET

7.1.2-5 (ECI) ecology consultants, In

Location Rio Blanco Proj. No. 83 Date 11/14/74 Day # 4

Investigator Sanz, Turner Survey Route same as day # 1

Weather clear to overcast, cool

X	inoperable due	26	—
X	to road conditions	27	mouse
X	(couldn't get there)	28	mouse
X		29	mouse
X		30	mouse
X		31	mouse
X		32	—
8	—	33	—
9	—	34	mouse
10	—	35	mouse - deer
11	—	36	mouse
12	—	37	mouse
13	—	38	chipmunk
14	—	(39)	coyote
15	—	40	mouse
16	—	41	chipmunk
17	—	42	mouse
18	—	43	chipmunk
19	—	44	mouse
20	deer	45	mouse
21	—	46	mouse
22	mouse	47	cow
23	mouse	48	—
24	mouse	49	—
25	chipmunk	50	chipmunk

PREDATOR S' 'T-STATION VISITATION FIELD DAT SHEET

7.1.2-6 (ECI) ecology consultants, Inc

Location Rio Blanco Proj. No. 83 Date 11/15/74 Day # 5

Investigator Turner, Sanz Survey Route same as day # 1

Weather overcast, cool

X	inoperable,	26	—
X	unable to	27	mouse
X	check due to	28	—
X	road conditions	29	mouse
X	↓ ↓ ↓	30	mouse
X	inoperable	31	mouse
X	crusted snow	32	mouse
X	↓ ↓ ↓	33	rabbit
X	↓ ↓ ↓	34	mouse
?	coyote	35	mouse
X	inoperable, frozen dirt	36	mouse
12	—	37	mouse
13	—	38	mouse
X	undistinguishabe	39	mouse
15	—	40	—
16	—	41	mouse
17	—	42	mouse
X	inoperable (knocked over)	43	mouse
19	—	44	mouse
20	mouse	45	mouse
21	—	46	mouse
22	mouse	47	mouse
23	—	48	—
24	—	49	mouse
25	mouse	50	—

PREDATOR SCENT-STATION VISITATION FIELD DATA SHEET 7.1.2-7 (ECI) ecology consultants, Inc

Location RIO BLANCO Proj. No. 83 Date 10-FEB-75 Day # 1

Investigator SANZ, BAKER Survey Route SAME AS NOVEMBER

SAMPLE Weather

X		26	
X		27	
X		28	
X	time & weather conditions	29	
X	did not allow, establish-	X	capsule buried
X	ment of these on	31	
X	9-Feb-75	(32)	weasel
X		33	(coyote approached but not w/in 3 ft.)
X		34	
X		35	(coyote w/in 5 ft.)
X		(36)	coyote
X		(37)	coyote (took bait, urinated on spot.)
X	inoperable do to	38	
X	high winds & severe	39	rabbit (coyote approached, w/in 3 ft.
X	snow conditions	X	capsule covered by snow
X		41	mouse (dirt connected)
X		X	snow
X		43	
X		44	
X		X	snow
X		X	snow
21		X	snow
X	buried capsule	48	
23		X	blown snow 3/4 inch
24		50	mouse
25			

PREDATOR SCENT-STATION VISITATION FIELD DATA SHEET

1.1.2-8 (ECI)
ecology consultants, Inc

Location RIO BLANCO Proj. No. 83 Date 11-FEB-75 Day # 2

Investigator SANZ, BAKER Survey Route SAME AS DAY #1

Weather CLEAR COLD

X
X
X
X
X } not established until
X } today because of
X } weather & road cond.
X
X blown snow
X blown snow
X blown snow
X blown snow
13
X blown snow
X blown snow
16
X blown snow
18
19
20
21 mouse
22 mouse
23 rabbit
24
25 deer

26
27 coyote
28
29
30
31
32
33
34
35 mouse
36
X snow covered
38
39
40
41 mouse
42
X buried
44
45
X buried
X buried
X buried
49
50 mouse

7.1.2-9 (ECI)

PREDATOR SCENT-STATION VISITATION FIELD DATA SHEET

ecology consultants, Inc.

Location RIO BLANCO Proj. No. 82 Date 12-FEB-75 Day # 3

Investigator SANZ, BAKER Survey Route SAME AS DAY #1

Weather CLEAR, COLD

(1)	coyote	26	
2		27	
3		28	
4		29	
5		30	
6		31	
X	drifted shour	32	
X	drifted snour	33	
9		34	
		35	mouse
(11)	coyote	36	
12		37	
13		38	
14		39	(tracks nearby)
15		40	(tracks nearby)
16		41	
X	driftet snour	42	
18		43	
19		44	deer
20		X	buried
21		(46)	coyote
22	mouse	(47)	coyote
23		48	
24		49	
25		50	

PREDATOR SCENT-STATION VISITATION FIELD DATA SHEET

7.1.2-10 (ECI)
ecology consultants, Inc

Location RIO BLANCO Proj. No. 83 Date 13-FEB 75 Day # 4

Investigator SANIZ, BAKER Survey Route SAME AS DAY #1

Weather OVERCAST

1		26	
(2)	coyote	27	
3		28	
4		29	
5		30	
6		31	
X	blown shour	32	
8		33	
X	blown shour	34	
(9)	weasel	35	
10 X	blown shour	36	
12		37	
13		38	mouse
14		39	
15		40	
16		41	
17		42	
18		43	
19		44 X	buried by snow
20		45	
21	[illegible]	46	
22	[illegible]	47	
23	cottontail	(48)	coyote
24		49	
25		50	

PREDATOR SCENT-STATION VISITATION FIELD DATA SHEET

7.1.2-11 (ECI)
ecology consultants, In

Location RIO BLANCO Proj. No. 83 Date 12 FEB Day # 5

Investigator SANZ, BAKER Survey Route SAME AS DAY #1

Weather SNOWY, 30°

X		26	
X		X	inoperable
X		28	mouse
X		X	inoperable
X		X	" "
X		X	" "
X		32	
X		X	inoperable
X		X	" "
X		35	
X		X	inoperable
X		X	" "
X		X	" "
14		(39)	coyote
15		(40)	coyote
16	(cottontail)	41	
17		X	inoperable
18		X	" "
19		X	" "
X		45	
21		(46)	coyote
22		47	
23		(48)	coyote
24		X	inoperable (capsule found)
25		50	

IV. MAMMALIAN PREDATORS

B. Coyote Siren Census (7.2.2)

7.2.2

SIREN-ELICITED HO[illegible]NG RESPONSE

Location Rio Blanco Project No. 83 Date 10-FEB-75 Investigators SANZ, BAKER

Survey Route [illegible] Weather CLEAR, 30°

Station Number	Time	Response to First Sounding Groups	Response to First Sounding Individual	Response to Second Sounding Groups	Response to Second Sounding Individual	Total Response Groups	Total Response Individual	Notes on conditions affecting data; wind; proximity to humans, etc.
(1)	1:20	1	—	1	—	2	—	good
(2)	12:45	0	0	0	1	0	1	good conditions
3	12:00	—	—	—	—	—	—	interferance from generator at drill pad.
(4) HQ	11:00	0	0	1	—	1	—	good conditions owl type N 1
5								
6								
7								
8								
9	2:10	1	—	1	—	2	—	wind x10 mph
~~10~~ 11	2:45	0	0	1	1	1	1	Good

SIREN-ELICITED H ING RESPONSE

Location Rio Blanco Project No. 83 Date 11/11/74 Investigators Turner, Sanz

Survey Route 84 road → Corral Gulch → Box Elder → Top Weather calm & clear at start

Station Number	Time	Response to First Sounding Groups	Response to First Sounding Individuals	Add. Response to Second Sounding Groups	Add. Response to Second Sounding Individuals	Total Response Groups	Total Response Individuals	Notes on conditions affecting data; wind; proximity to humans, etc.
(1)	8:45	—	——	3	3	3	3	
(2)	9:15	—	——	1	2	1	2	
(3)	10:30	—	——	1	1	1	1	6 mi between 2 and 3 to avoid noise from drill rig
(4)	11:05	2	3	—	——	2	3	wind ≥ 10 mph.
5	11:35	—	——	—	——	—	——	wind ≥ 10 mph.
6								
7								
8			SURVEY DISCONTINUED					
9			BECAUSE OF ROAD CONDITIONS					
10								

SIREN-ELICITED H ING RESPONSE

Location Rio Blanco Project No. 83 Date 11/11/74 Investigators Turner, Sanz

Survey Route 84 road → Corral Gulch → Box Elder → Top Weather calm & clear at start

Station Number	Time	Response to First Sounding Groups	Response to First Sounding Individuals	Add. Response to Second Sounding Groups	Add. Response to Second Sounding Individuals	Total Response Groups	Total Response Individuals	Notes on conditions affecting data; wind; proximity to humans, etc.
(1)	8:45	—	—	3	3	3	3	
(2)	9:15	—	—	1	2	1	2	
(3)	10:30	—	—	1	1	1	1	6 mi between 2 and 3 to avoid noise from drill rig
(4)	11:05	2	3	—	—	2	3	wind ≥ 10 mph.
5	11:35	—	—	—	—	—	—	wind ≥ 10 mph.
6								
7								
8			SURVEY DISCONTINUED					
9			BECAUSE OF ROAD CONDITIONS					
10								

SIREN-ELICITED H[illegible]ING RESPONSE

Location Rio Blanco Project No. 83 Date 11/13/74 Investigators Sanz, Turner

Survey Route same as 11/11/74 plus int. cath. bluff road & ryan → Top Weather calm, clear, 30°F

Station Number	Time	Response to First Sounding Groups	Response to First Sounding Individuals	Add. Response to Second Sounding Groups	Add. Response to Second Sounding Individuals	Total Response Groups	Total Response Individuals	Notes on conditions affecting data; wind; proximity to humans, etc.
1	8:00	—	—	—	—	—	—	
2	8:25	—	—	—	—	—	—	
3	9:05	—	—	—	—	—	—	6. mi. between 2 and 3 to avoid noise from drill rig.
(4)	9:35	1	1	—	—	1	1	
(5)	10:05	—	—	1	1	1	1	
(6)	11:00	1	3	—	—	1	3	
(7)	11:30	1	1	—	—	1	1	
8	12:00	—	—	1	1	1	1	
(9)	12:30	—	—	—	—	—	—	wind ± 10 mph
(10)	1:00	—	—	1	2	1	2	wind ≈ 10 mph

7.2.2.4

SIREN-ELICITED H[illegible]ING RESPONSE

Location RIO BLANCO Project No. 83 Date 12-FEB-75 Investigators SHAW, SINCLIC

Survey Route _____ Weather HIGH OVERCAST, CALM

Station Number	Time	Response to First Sounding Groups	Response to First Sounding Individual	Response to Second Sounding Groups	Response to Second Sounding Individual	Total Response Groups	Total Response Individual	Notes on conditions affecting data; wind; proximity to humans, etc.
1	9:05	—	—	—	—	—	—	wind 5–10 mph
2	8:20	—	—	—	—	—	—	good conditions.
3	7:50	—	—	—	—	—	—	some interference from nearby generator!
(4)	7:20	—	—	1	—	1	—	good conditions
5								
6								
7								
8								
(9)	11:10	1	—	1	—	2	—	good conditions
~~10~~ 11	11:45	1	—	—	—	1	—	—

Mammalian Predators (14.1.3)

Distribution Records

FIELD OBSERVATIONS

H.1.3-1



Species Coyote Date 10/10/74 Time —

Means of Identification obs

Number Observed 1 ♂ ____ ♀ ____

Adult ____ Juv. ____

Habitat grassy knoll

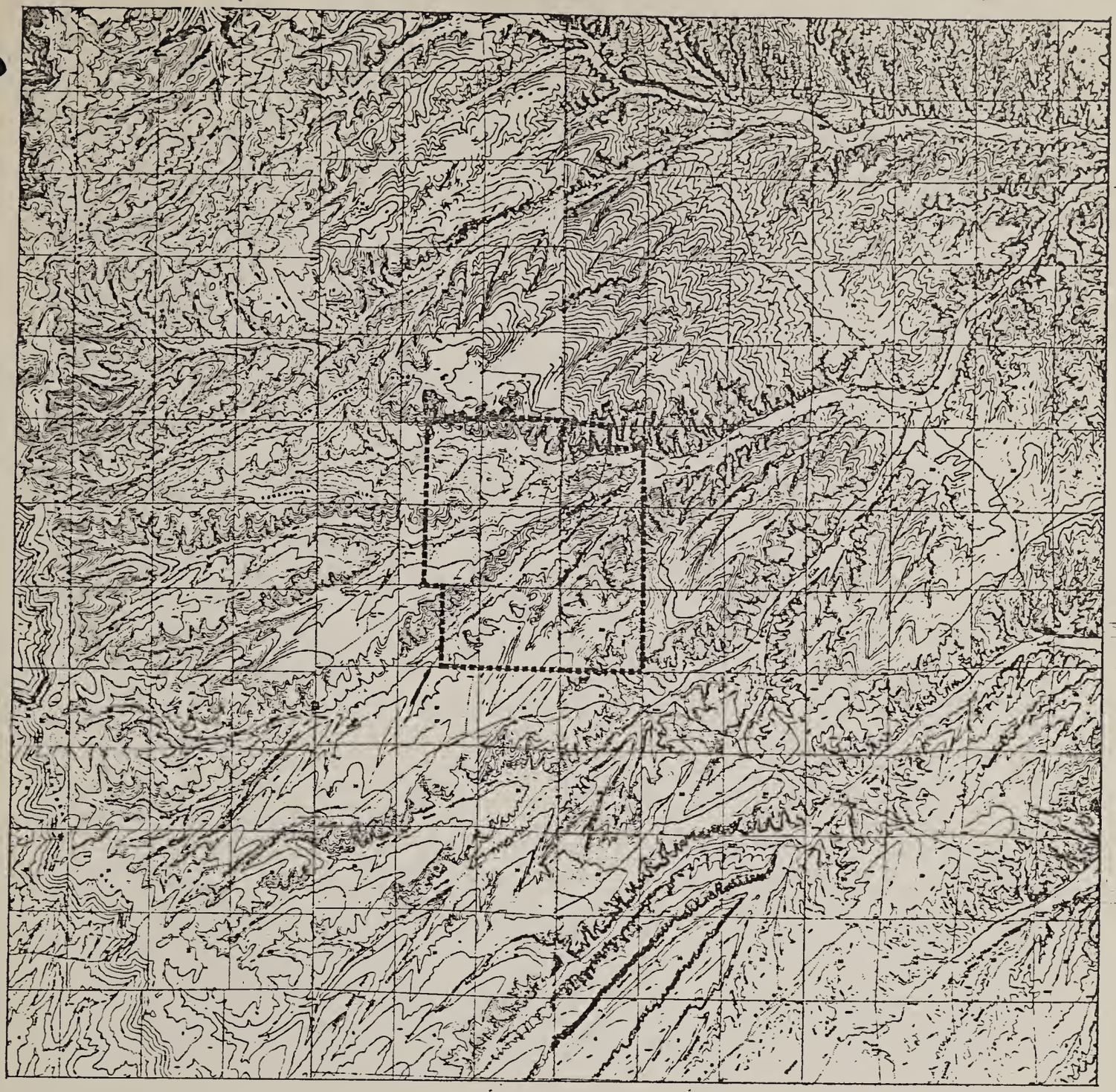
Other Information* ____

Observer JF, EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-2



Species Ovis dalli Date 10/19/74 Time —

Means of Identification obs.

Number Observed 1 ♂ ____ ♀ ____

Adult ____ Juv. ____

Habitat ____

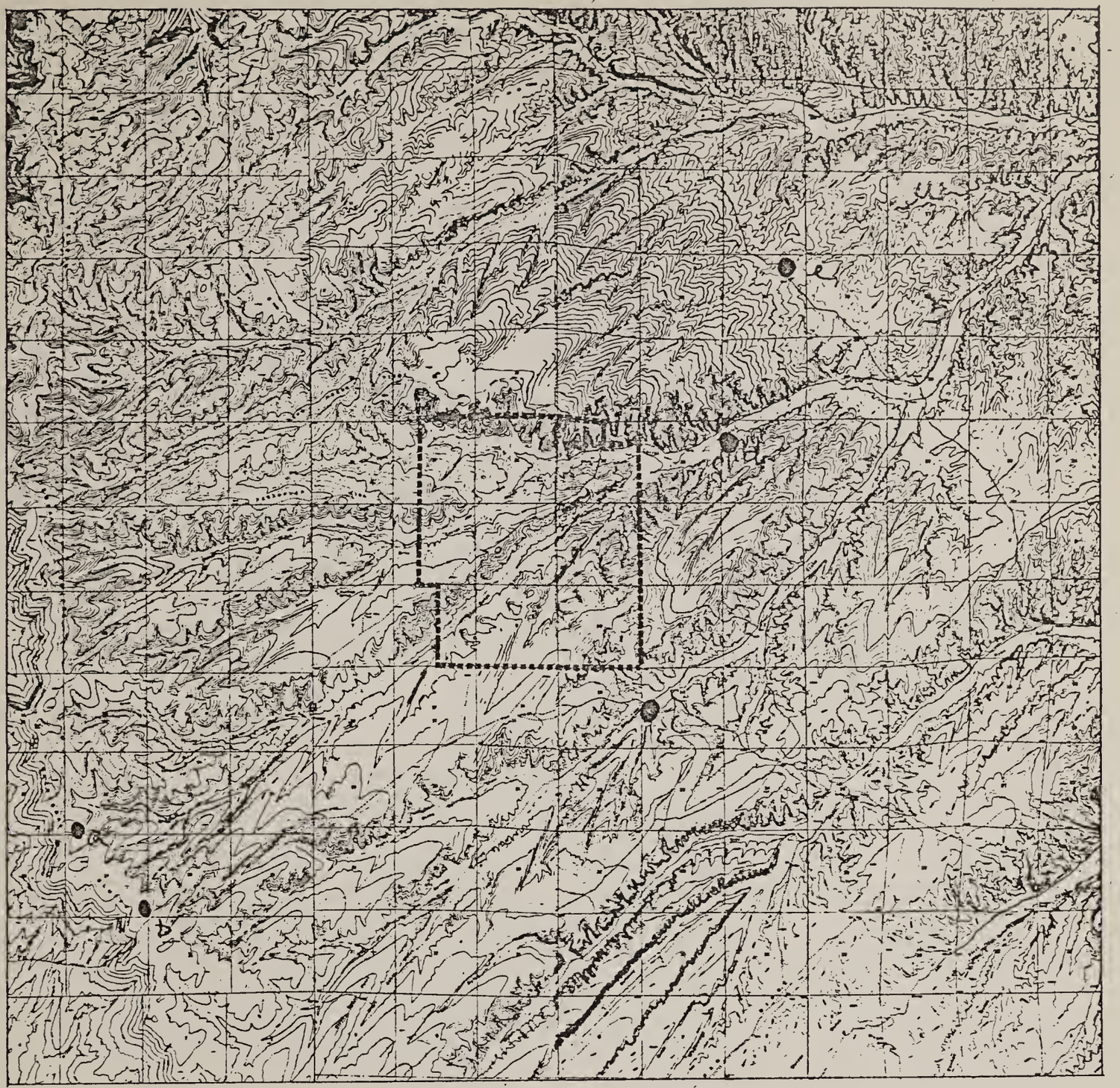
Other Information* ____

Observer SE, CK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-3



Species Coyote Date Nov 74 Time —

Means of Identification scat & tracks

Number Observed 5 ♂ ♀

Adult ✓ Juv.

Habitat all over

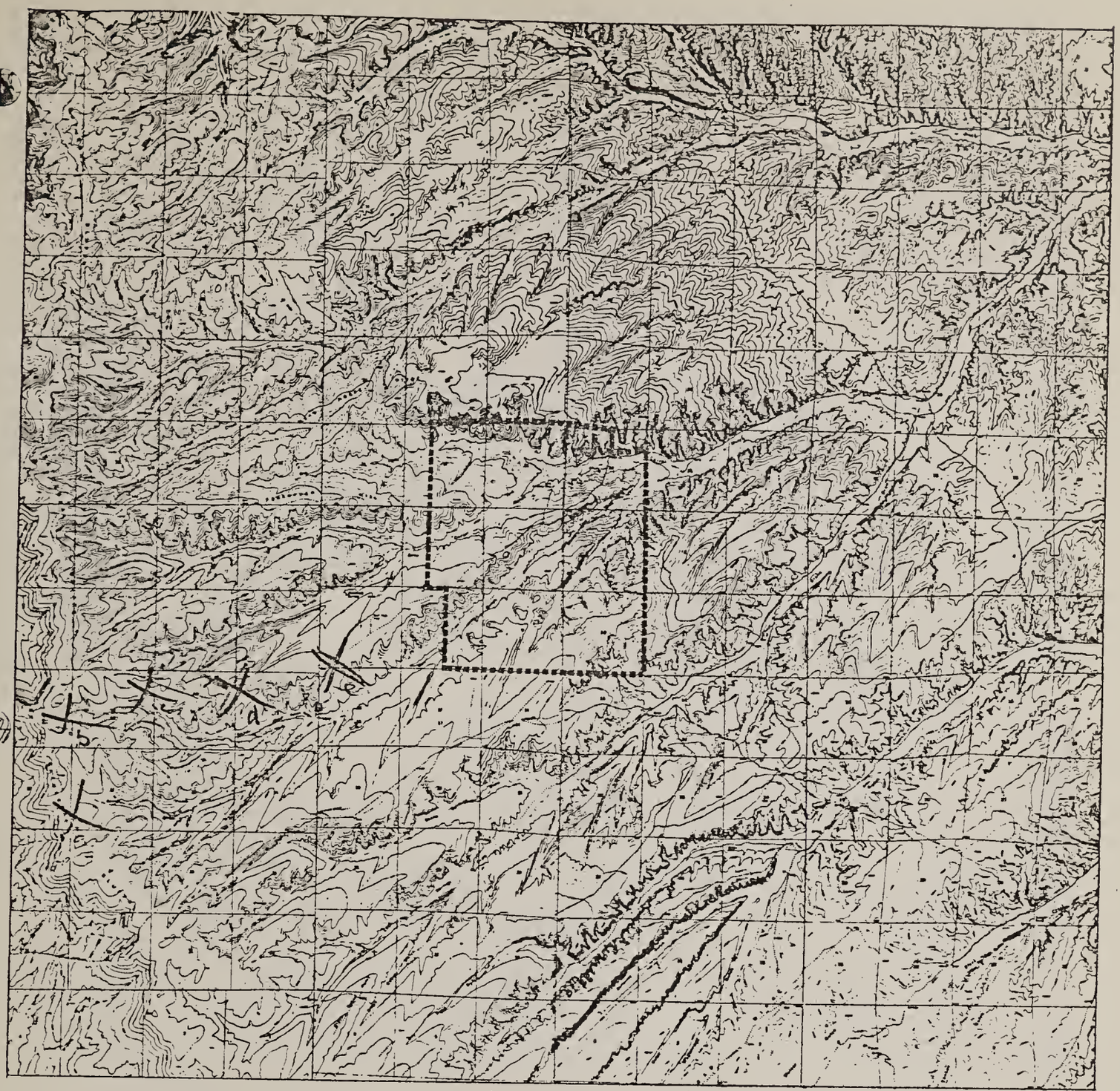
Other Information*

Observer Sanz

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-4



Species coyote Date 12/6/74 Time 2-4 pm

Means of Identification tracks

Number Observed several-to-many ♂ ____ ♀ ____

Adult ____ Juv. ____

Habitat sage-upland meadow

Other Information* coyote tracks are numerous and are frequently encountered

Observer Turner

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS 14.1.3-5



Species Coyote Date 12/8/74 Time 12:55

Means of Identification Tracks

Number Observed 1, 2 ♂ — ♀ —

Adult ✓ Juv. _____

Habitat Sage - Rabbitbrush

Other Information* _____

Observer Ellinwood - Sassy

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-6



Species Coyote Date Dec 8, 1974 Time 11:00

Means of Identification Tracks

Number Observed 1 ♂ ____ ♀ ____

Adult ✓ Juv. ____

Habitat Greasewood - Sage

Other Information* on grid # A

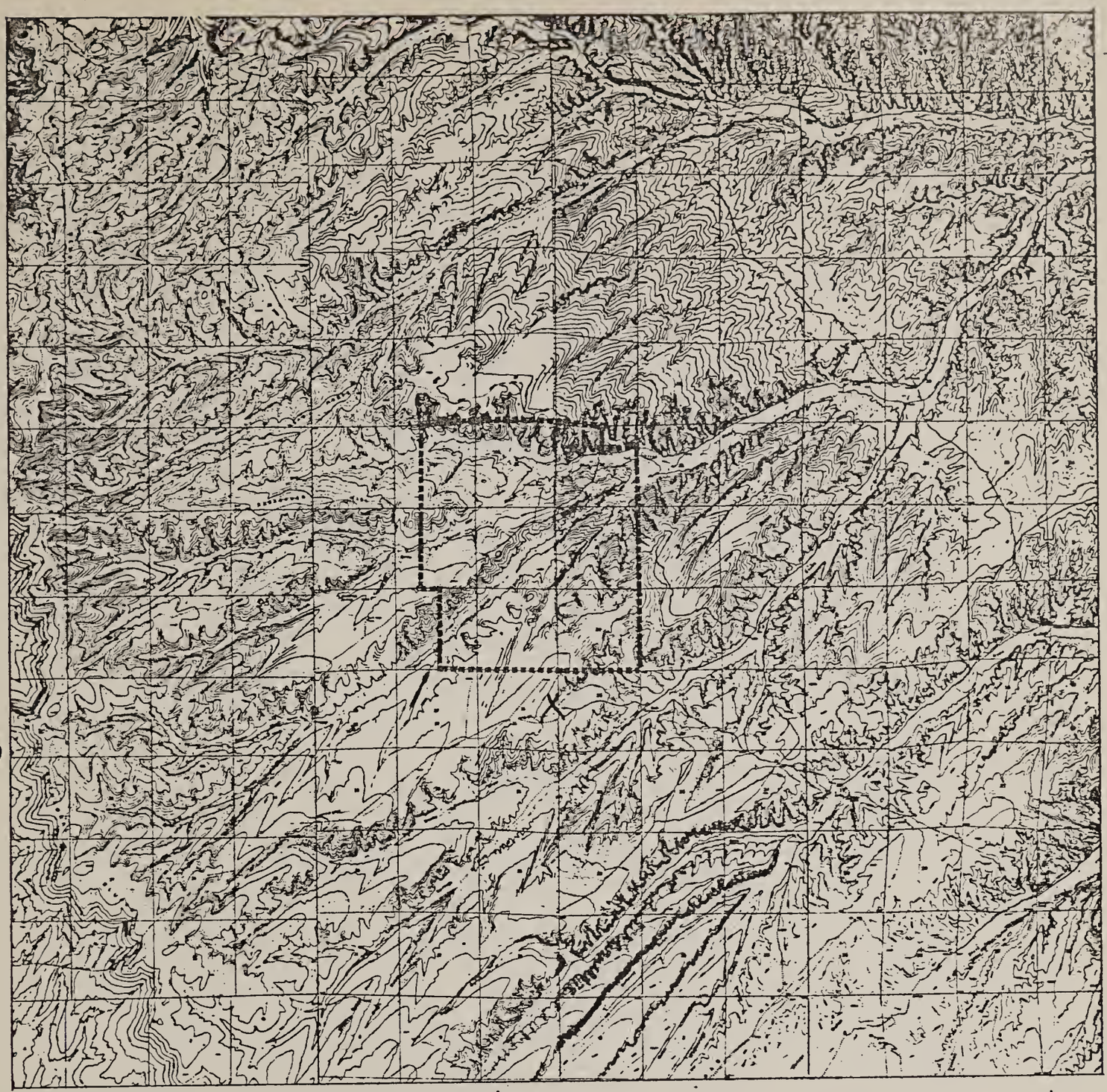
Observer Sam

* Include any distinguishing field marks for horses.

J. Baker

14.1.3-7

FIELD OBSERVATIONS



Species Coyote Date 12/9/74 Time 0858

Means of Identification visual observation from aircraft during big game flight

Number Observed 1 ♂ ♀

Adult X Juv.

Habitat Pinyon-juniper

Other Information* animal running when observed

Observer Craig L Kleinig

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-8



Species CANIS latrans (coyote) Date Dec 15, 1974 Time 1050

Means of Identification VISUAL

Number Observed 5 ♂ _____ ♀ _____

Adult ✓ 2 Juv. ✓ 3

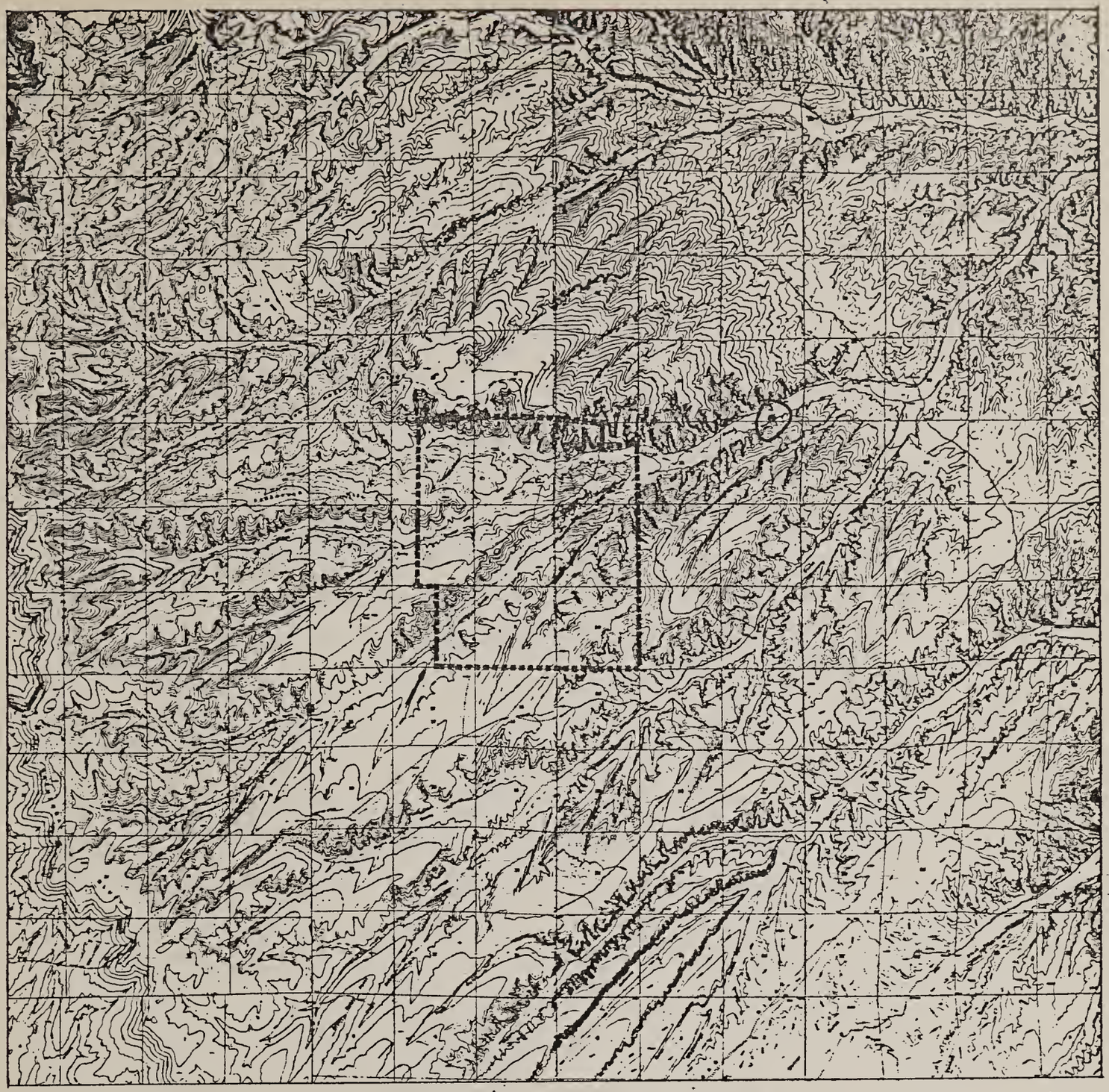
Habitat Sage.

Other Information* encounter w/ coyote killing deer (2 involved) coyote chasing coyote from area (3 involved) See van Horn for notes CANCACOG!

Observer VH JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS 14.1.3-9



Species Coyote Date Dec 16 Time 1630

Means of Identification VISUAL

Number Observed 3 ♂ ♀

Adult 1 Juv. 2

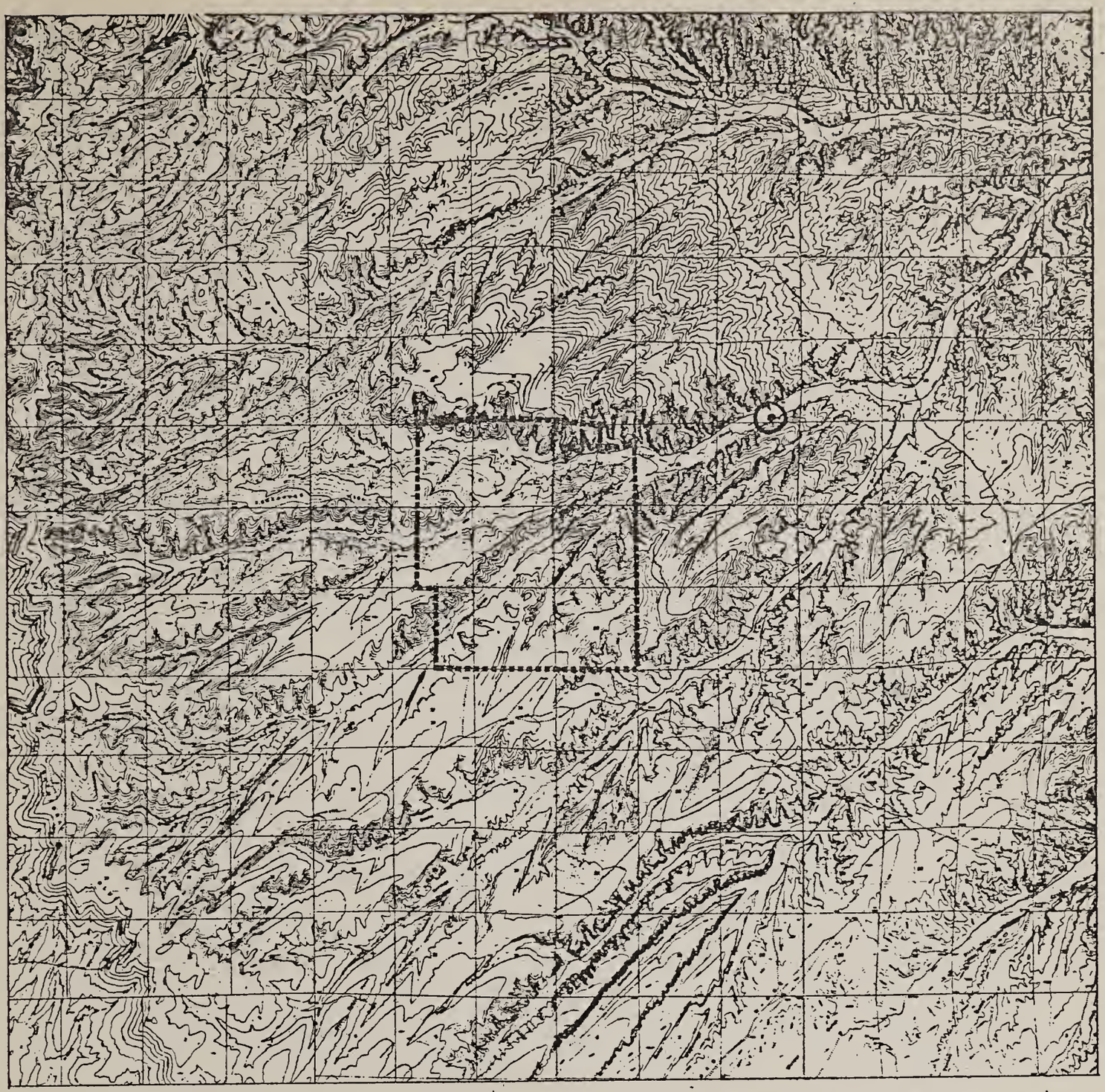
Habitat Sage

Other Information* ~~footings~~ near deer carcass

Observer VH

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS 3h 14.1.3-10



Species Coyote Date Dec 17, 1974 Time ~ 1520

Means of Identification VISUAL

Number Observed 2 ♂ ____ ♀ ____

Adult 1 Juv. 1

Habitat Sage

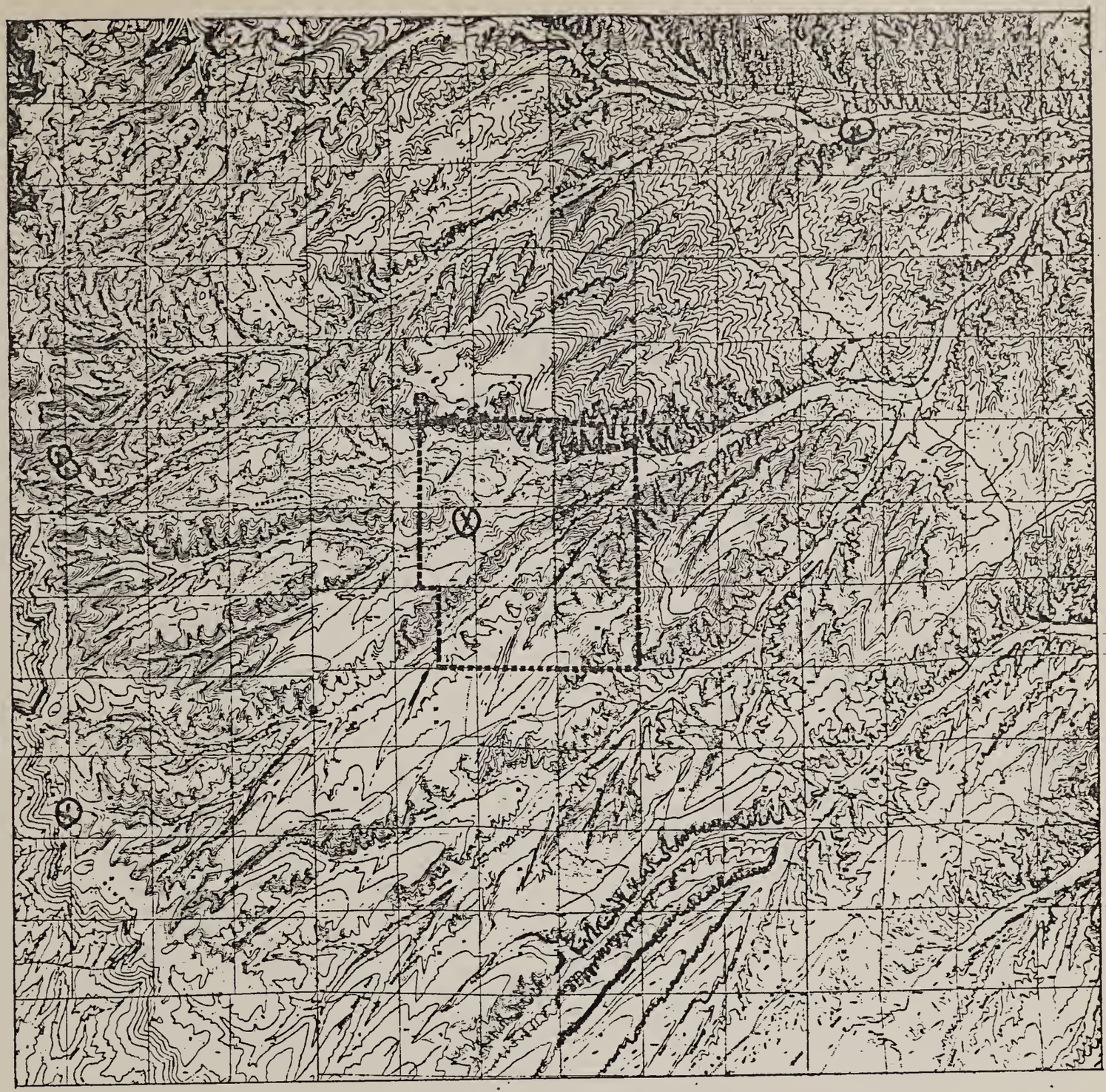
Other Information* at deer carcass

Observer VH JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-11



Species Coyote Date 12/30/74 Time 0833

Means of Identification Visual during Big Game Aerial Counts

Number Observed 5 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat Various

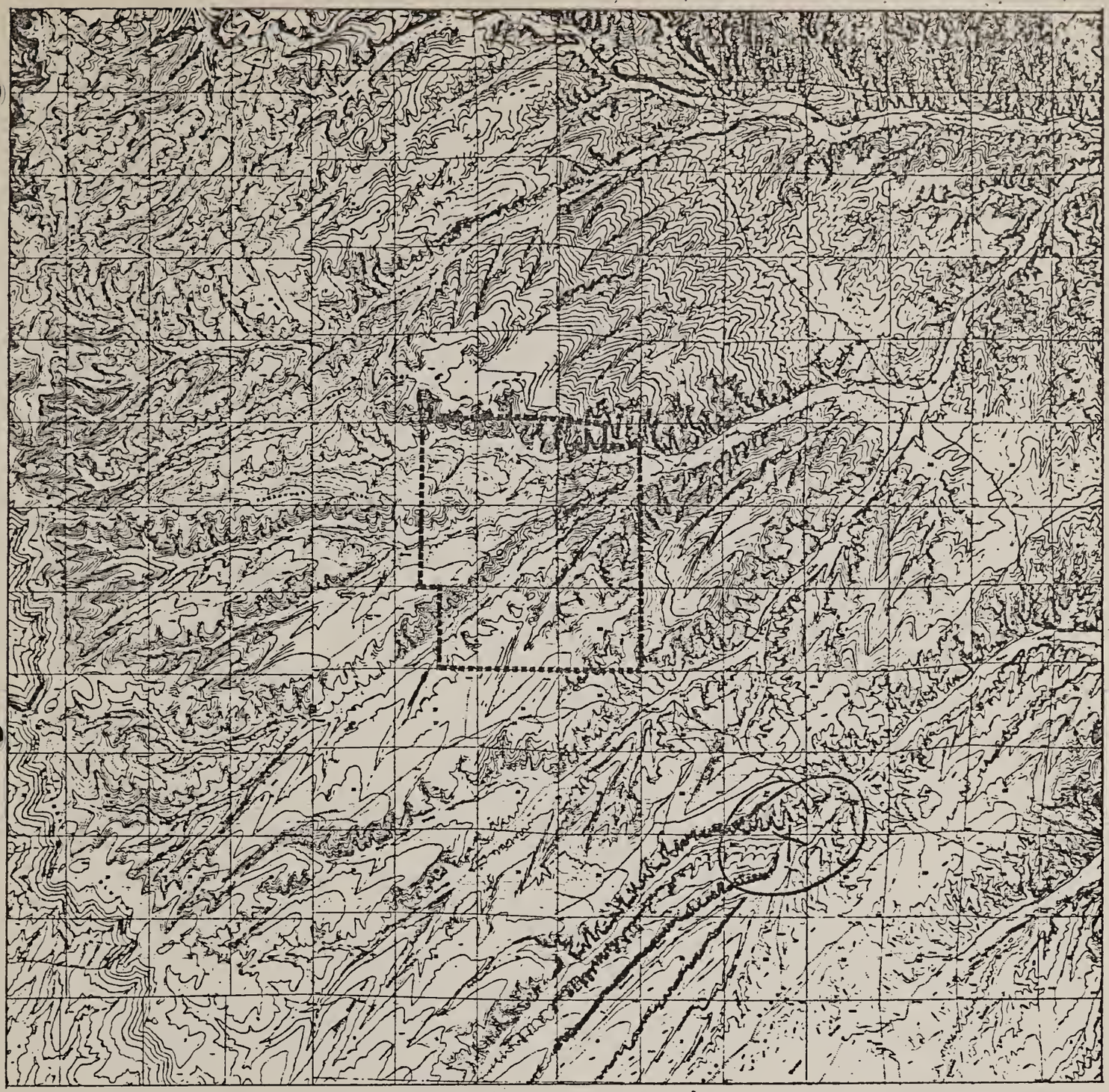
Other Information* _____

Observer Dennis Van Horn
Craig Kling

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-12



Species Canis latrans Coyote Date 1-14-75 Time 1310-1510

Means of Identification observation

Number Observed 1 ♂ ? ♀ ?

Adult ✓ Juv.

Habitat Confluence of Ryan + Galloway Gulch

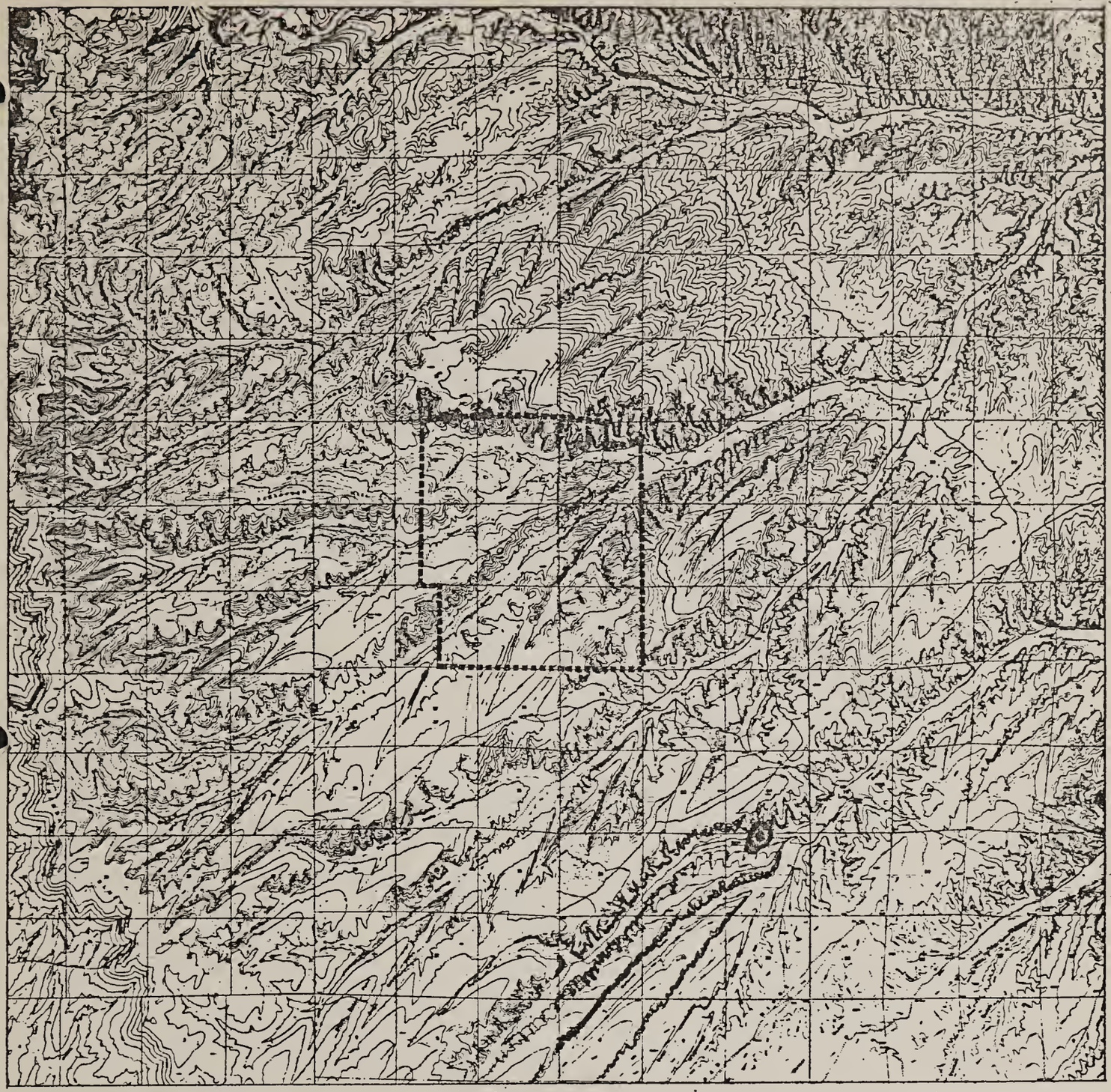
Other Information* observed on Aerial Census

Observer Van Horn

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-13



Species Canis latrans - Coyote Date 1-14-75 Time Between 0845 - 1125

Means of Identification observation

Number Observed 1 ♂ ? ♀ ?

Adult ✓ Juv.

Habitat Bottom of Ryan gulch

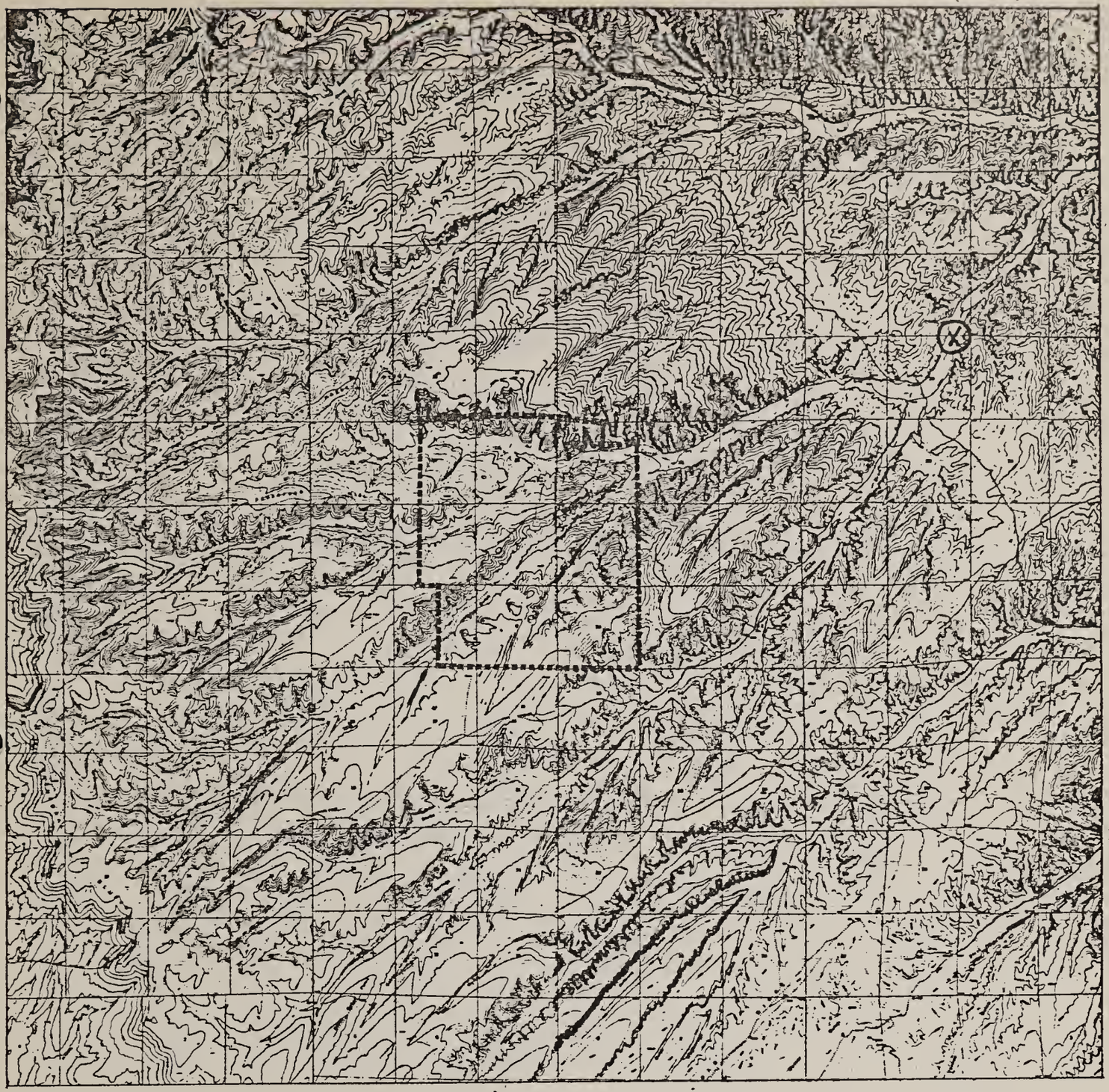
Other Information* observed during aerial survey. Transect 9 on eastside of C-a. Carrying prey in mouth.

Observer VanHorn

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-14



Species Canis latrans Date 2-19-75 Time 1800

Means of Identification Neural Transduction of optic Nerves

Number Observed 1 ♂ ♀

Adult ✓ Juv.

Habitat Bottomland meadow

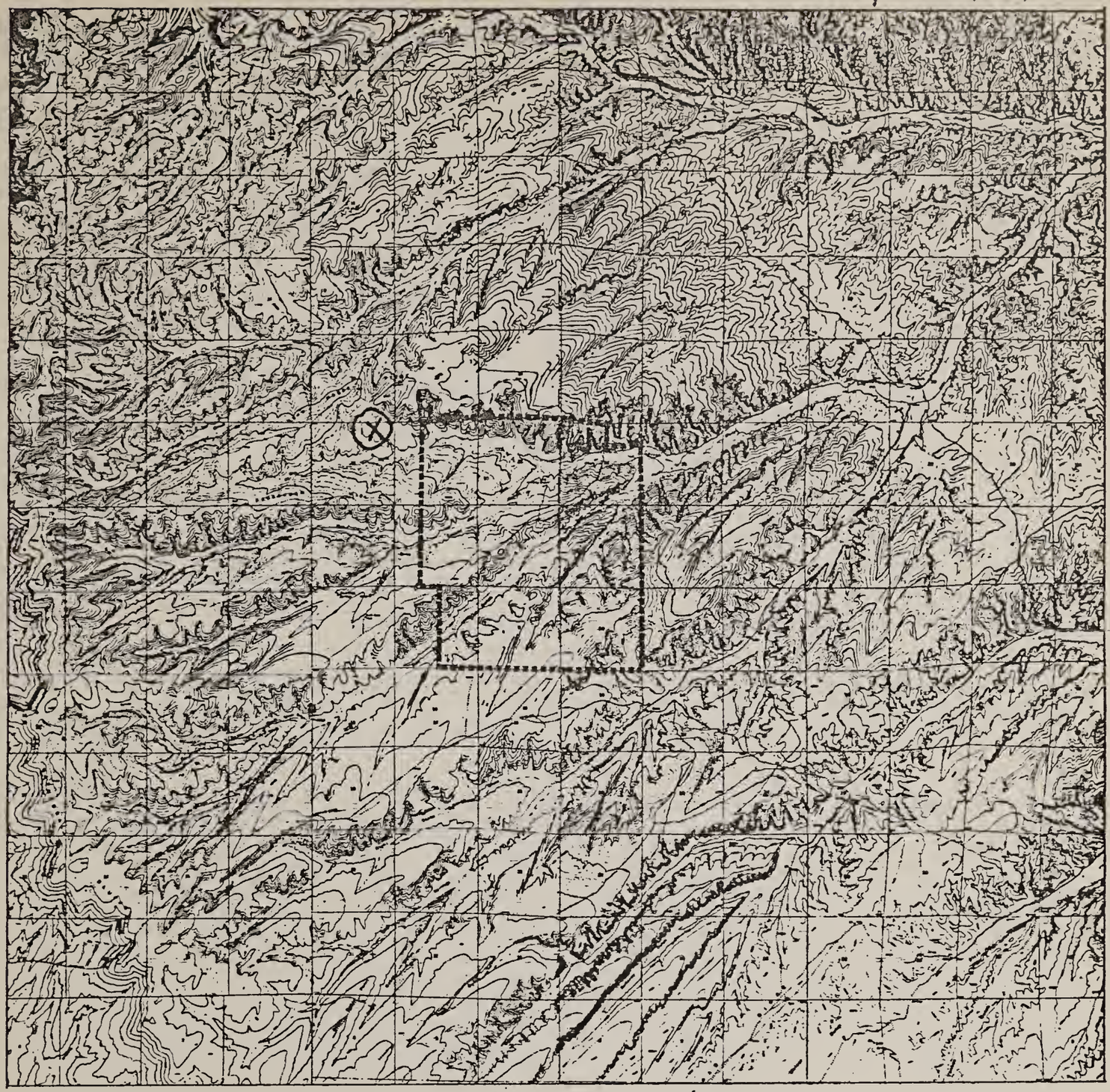
Other Information* feeding on Mule deer carcass

Observer VanHoen

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-15



Species Canis latrans Date 2-17-75 Time 1645

Means of Identification AUDITORY then VISUAL

Number Observed 7 ♂ ? ♀ ?

Adult _____ Juv. _____

Habitat South Slope P-J + mtn shrub

Other Information* howling close to horses + several walked w/in 20m of small herd.

Observer VH.

* Include any distinguishing field marks for horses.

14.1.3-16

FIELD OBSERVATIONS



Species Canis latrans Date 2-17-75 Time 0842

Means of Identification VISUAL

Number Observed 1 ♂ ____ ♀ ____

Adult ✓ Juv. ____

Habitat 84 Meso Ranch

Other Information* carrying what appeared to be the front leg + scapula of a deer or cow.

Observer VH + JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-17



Species COYOTE Date 2-16-75 Time 0940

Means of Identification AUDITORY, heard

Number ~~Observed~~ Heard 2+ ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat Sage - P-J.

Other Information* _____

Observer VH

* Include any distinguishing field marks for horses.

14.1.3-18

FIELD OBSERVATIONS



Species Coyote Date 2/12/74 Time 1035

Means of Identification visual - aerial census

Number Observed (IV) = 2 ♂ _____ ♀ _____

Adult 2 Juv. _____

Habitat 1= Pd. type 2= brush type

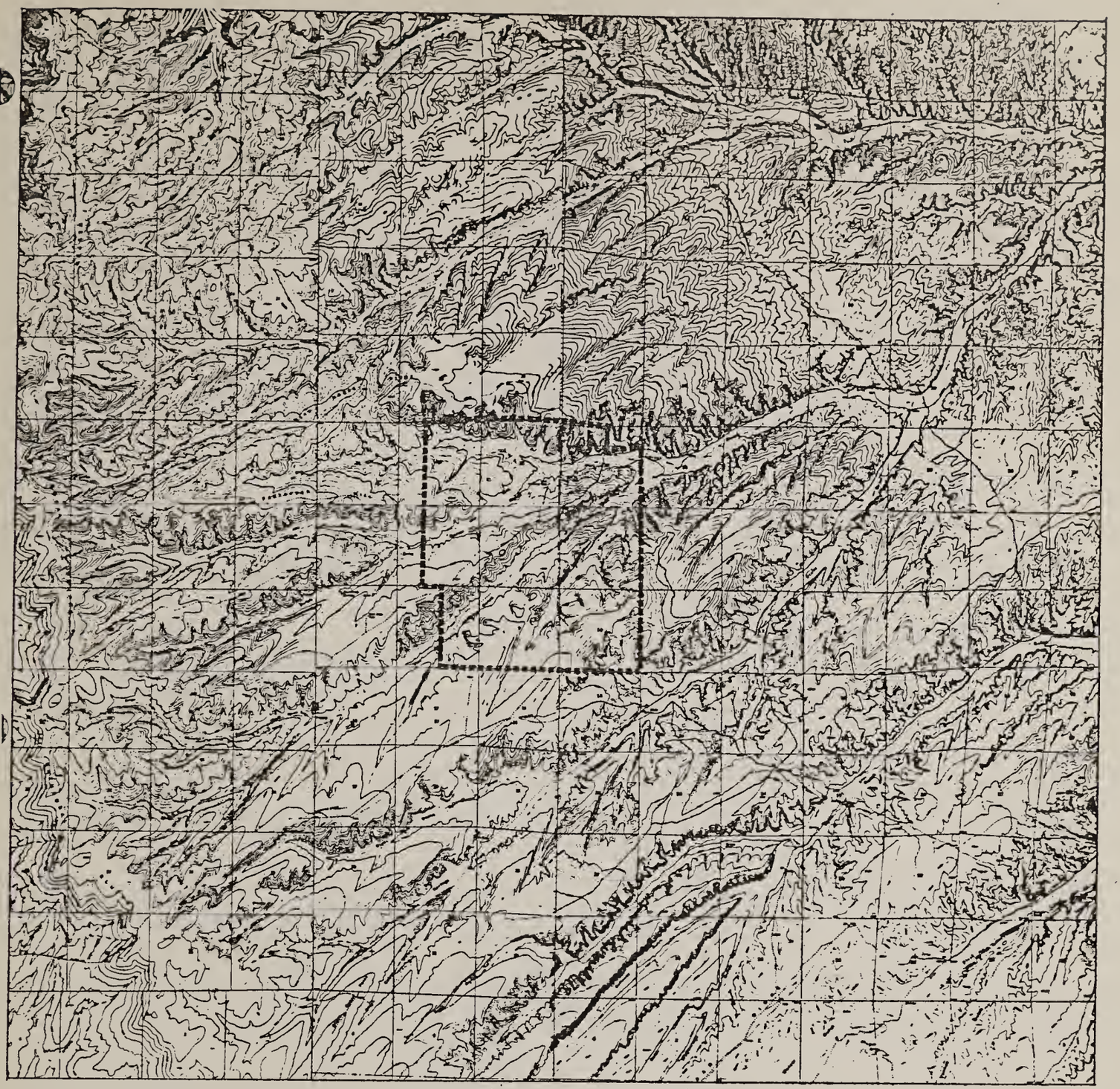
Other Information* both animals running through vegetation

Observer C. Kling

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-19



Species Coyote Date 2/8-14/25 Time _____

Means of Identification tracks in snow

Number Observed _____ ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat tracks throughout area (Bullenland 6300

Other Information* up to Cathedral Bluffs 8500) however more tracks seemed concentrated at lower elevations

Observer _____

Baker

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-20



Species Bob cat Date 10/11/74 Time —

Means of Identification scat

Number Observed 1 ♂ ____ ♀ ____

Adult ____ Juv. ____

Habitat ____

Other Information* observed, photographed, collected

Observer Van Horn, Reg

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-21



Species Bobcat Date 10/12/74 Time —

Means of Identification skull

Number Observed 1 ♂ ♀

Adult Juv.

Habitat Pinon - Juniper Sage

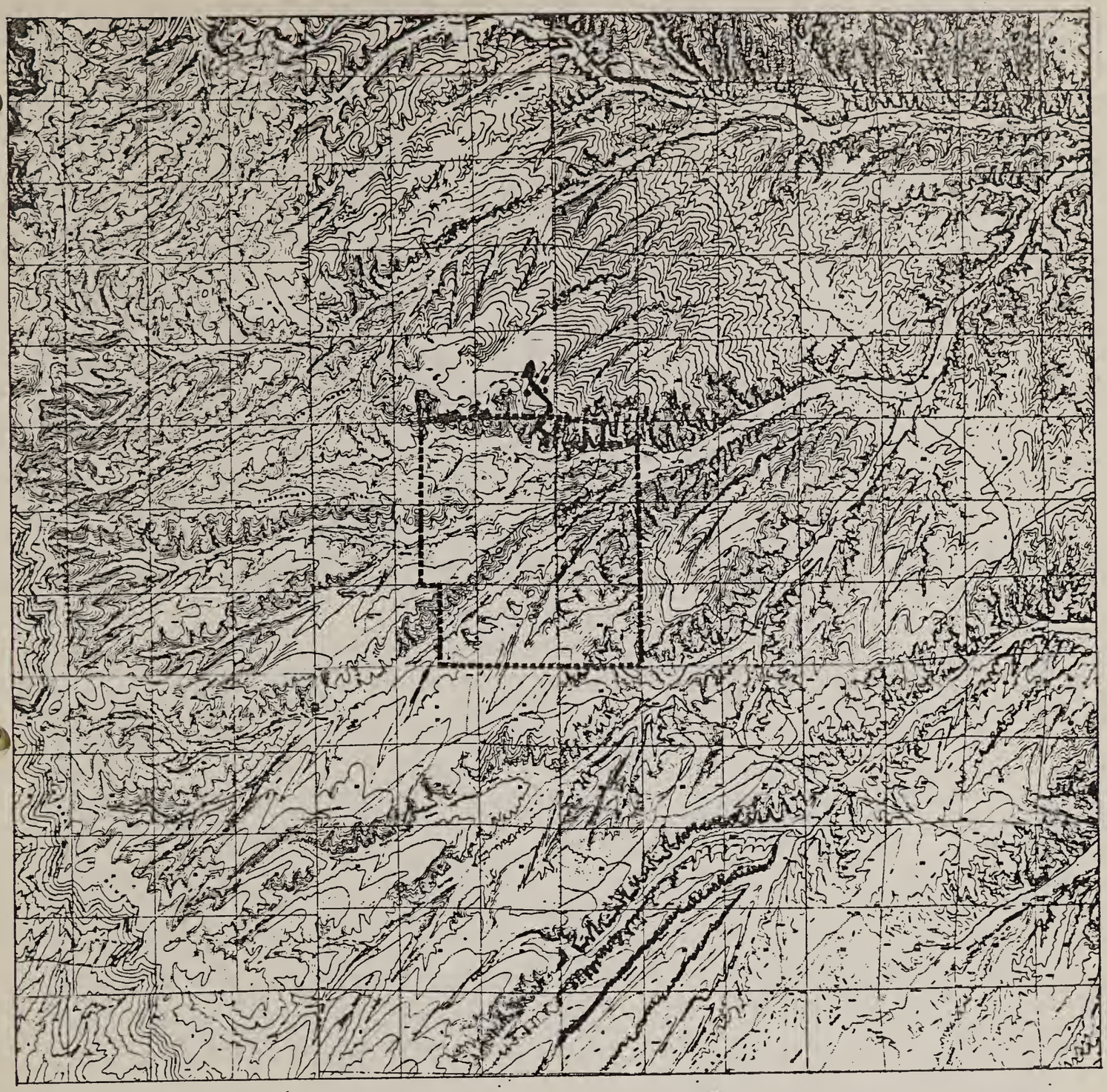
Other Information* collected

Observer Van Dam

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-22



Species Bobcats Date 2/19 Time 11-12

Means of Identification tracks

Number Observed 2 ♂ ♀

Adult Juv.

Habitat South P.J. and Ridgetop P.J.

Other Information* 2 bobcats traveling together, very fresh tracks. Other old tracks seen in the area of dots. Trailed them in direction of arrow.

Observer Cancelosi

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-23



Species American Badger Date 2/12/75 Time 2200

Means of Identification sight

Number Observed 1 ♂ ♀

Adult Juv.

Habitat Sage - P-J

Other Information* on road

Observer Sanz, Baker

* Include any distinguishing field marks for horses.

H.1.3-24



Species Short-tailed Weasel Date 2/9-13/75 Time _____

Means of Identification tracks in snow

Number Observed _____ ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat ~~[illegible]~~ half the size of other weasel tracks seen

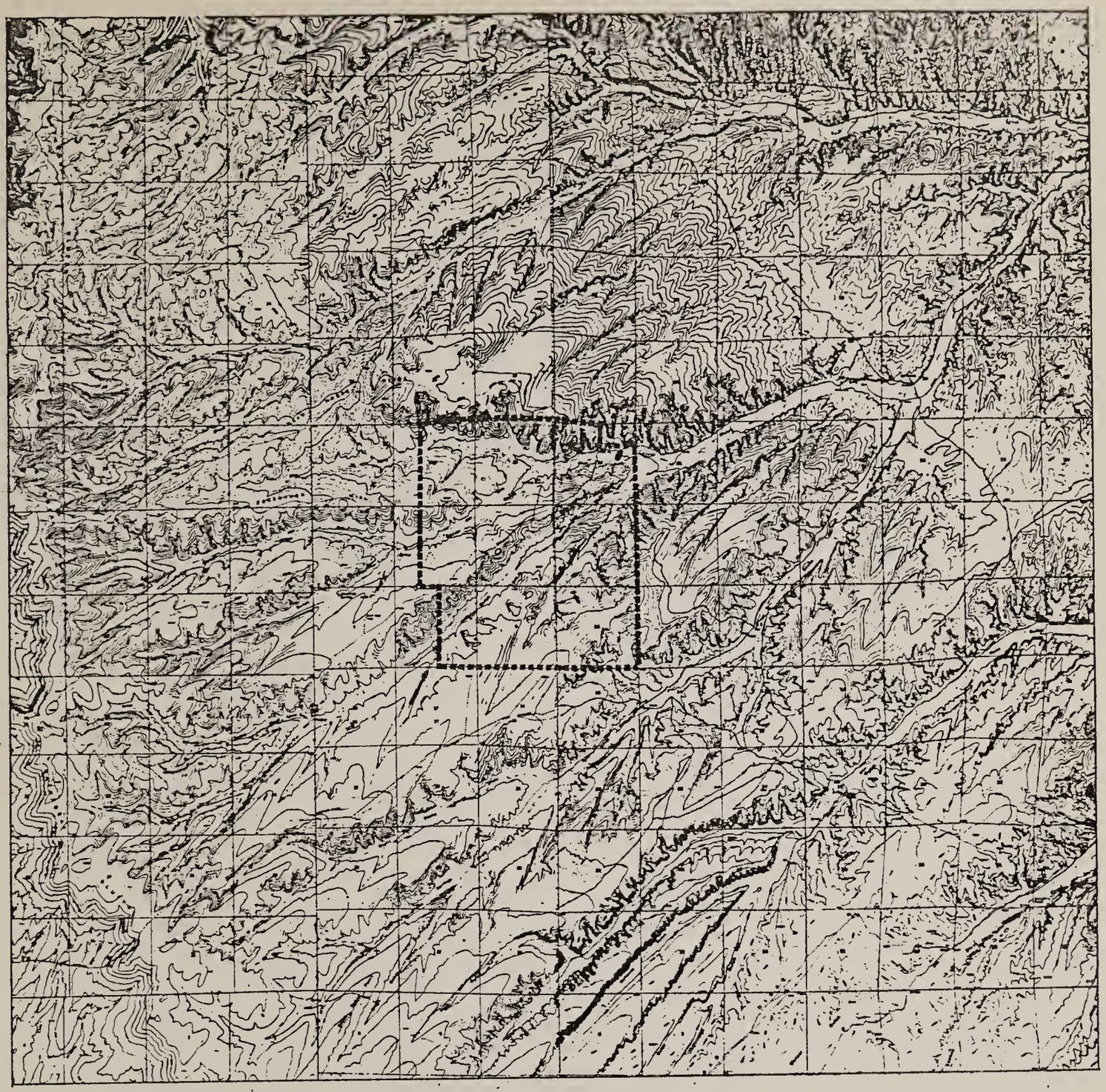
Other Information* _____

Observer Baker, Sams

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

M.1.3-25



Species Long-tailed Weasel Date 10/17 Time —

Means of Identification obs

Number Observed 1 ♂ ____ ♀ ____

Adult ____ Juv. ____

Habitat on road, bottomland sage

Other Information* ____

Observer Sam Ellwood

Baker Connecticut

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-26



Species Long-tailed Weasel Date 10/22/74 Time _____

Means of Identification obs

Number Observed 1 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat on road, bottom land, rags

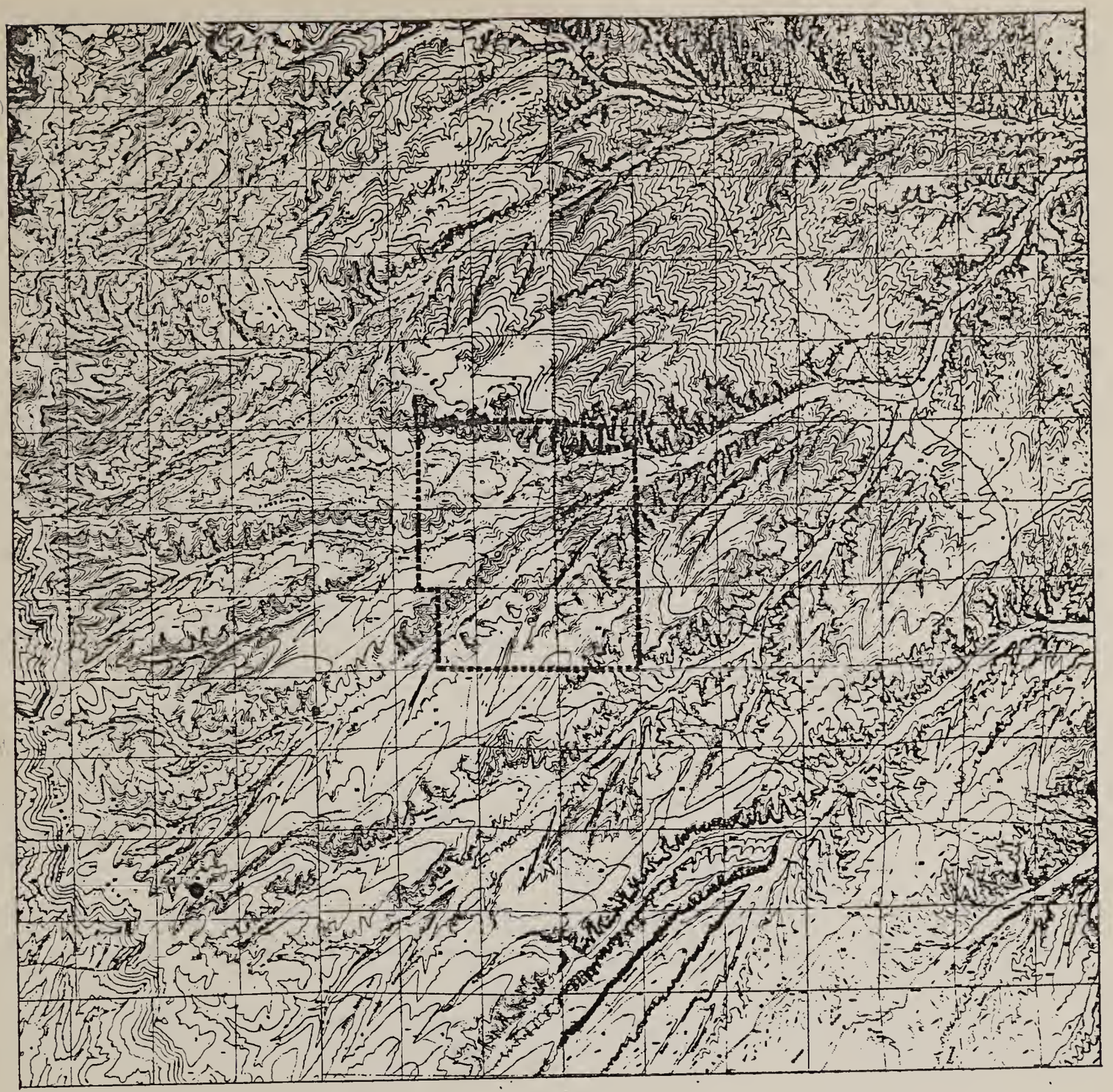
Other Information* _____

Observer Concealos

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3 – 27



Species long-tailed ~~weasel~~ weasel Date Nov - 74 Time ——

Means of Identification observation

Number Observed 1 ♂ _____ ♀ _____

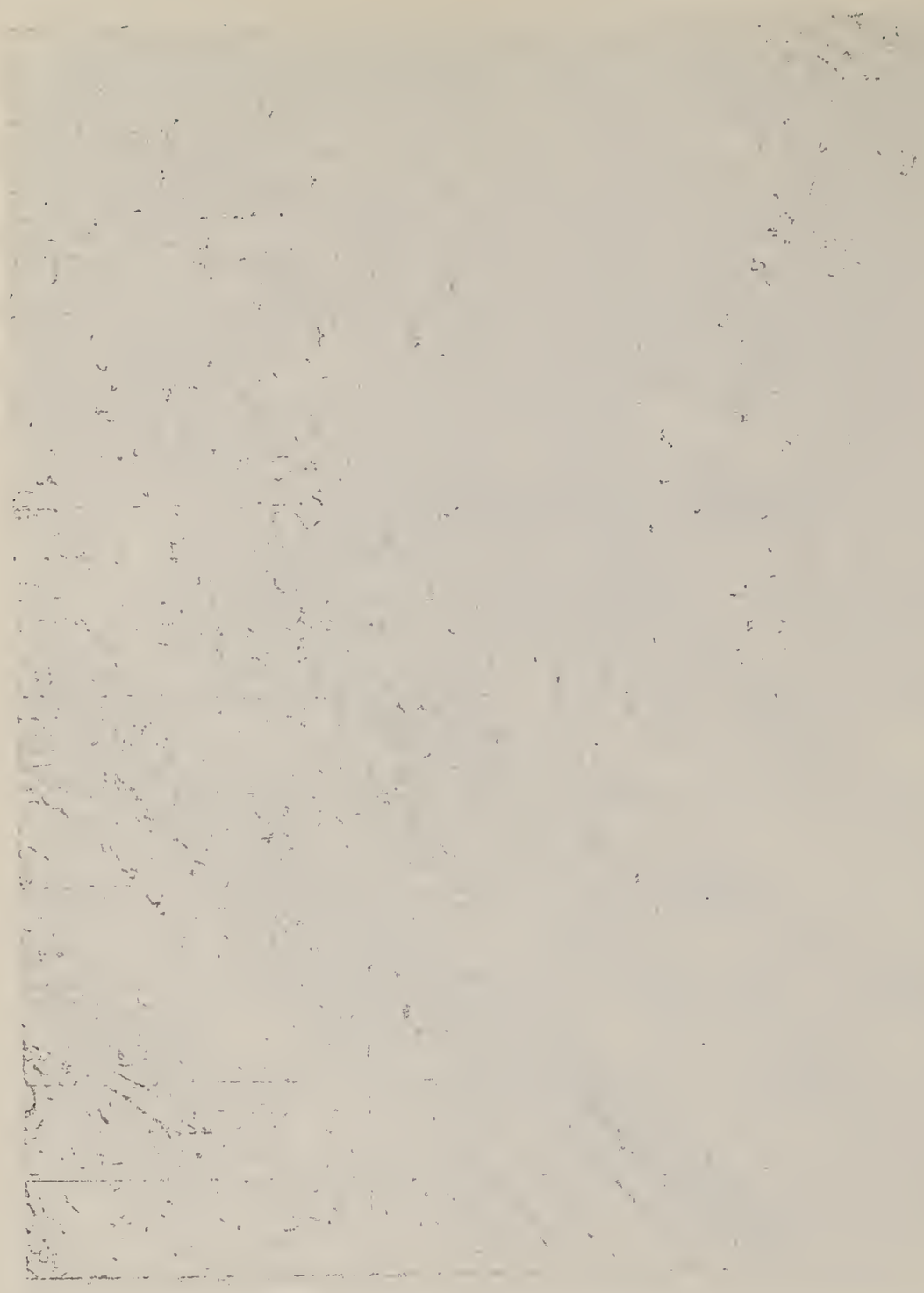
Adult ✓ Juv. _____

Habitat in open snow near bluffs

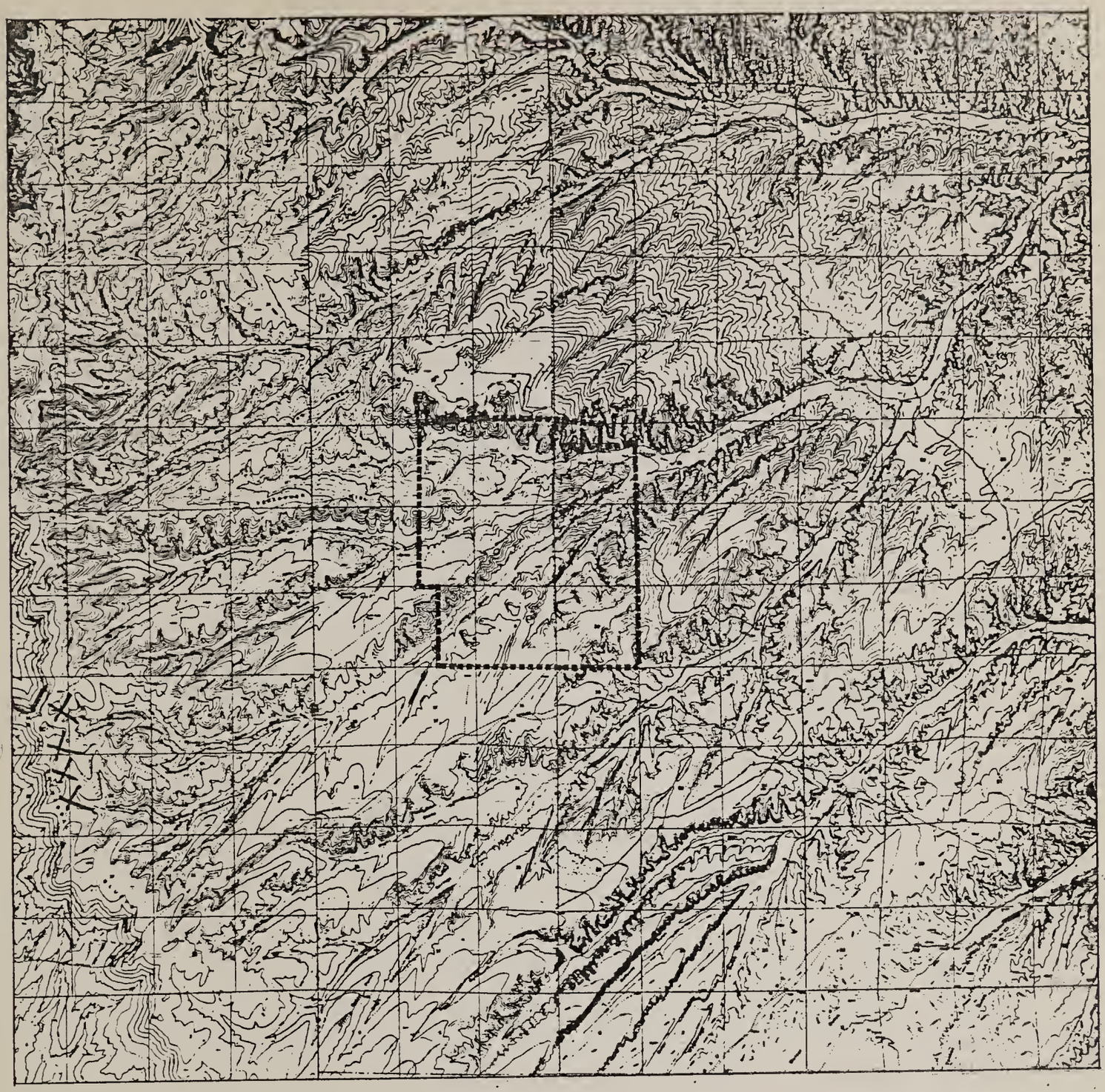
Other Information* _____

Observer Sam

* Include any distinguishing field marks for horses.



FIELD OBSERVATIONS 14.1.3 - 28



Species long tail weasel Date 12/6/79 Time 3-4 pm

Means of Identification tracks

Number Observed 4 sets of tracks ♂ _____ ♀ _____

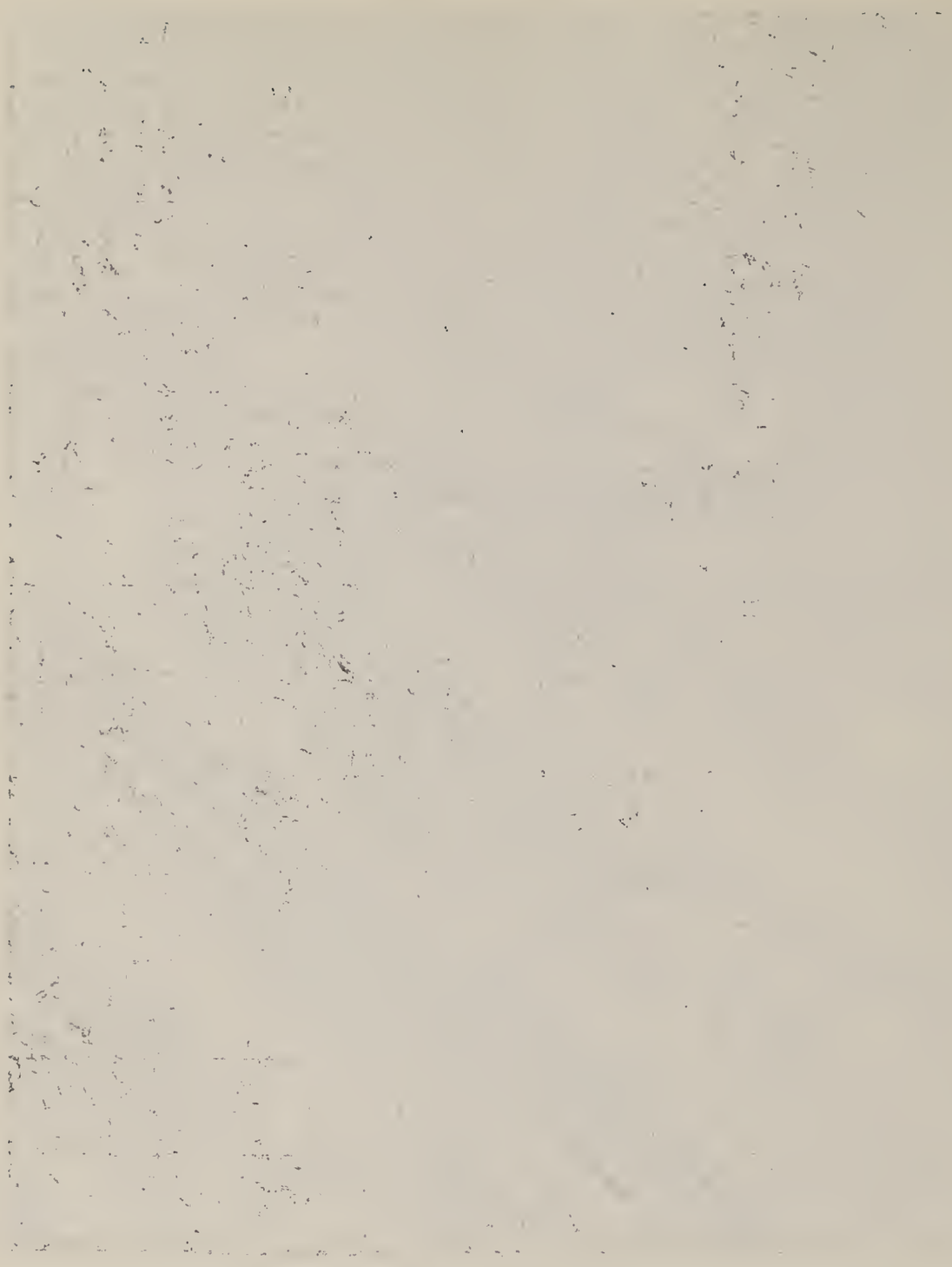
Adult _____ Juv. _____

Habitat sage - upland meadow

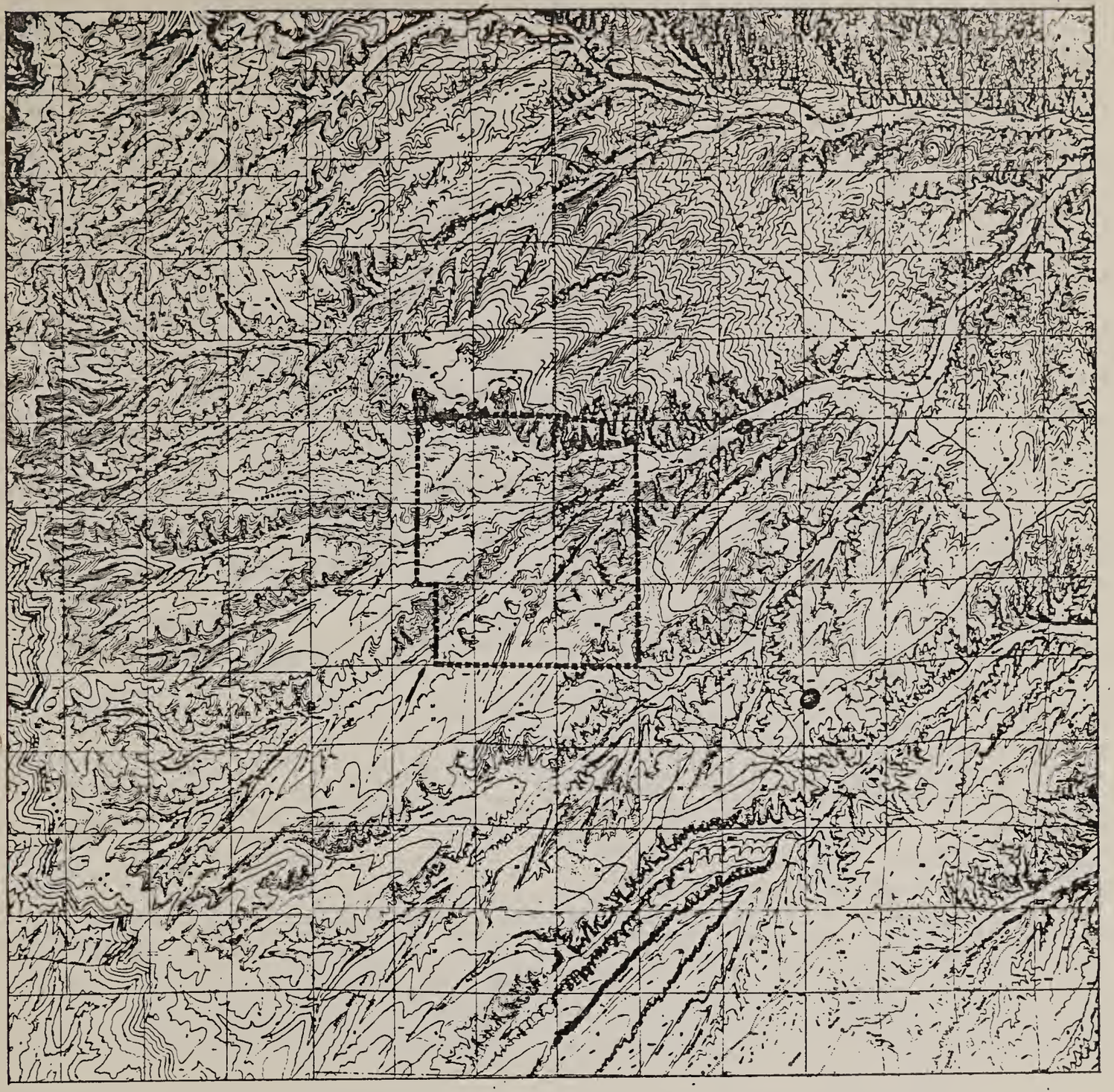
Other Information* weasels appear to be numerous

Observer Turner

* Include any distinguishing field marks for horses.



FIELD OBSERVATIONS 14.1.3 – 29



Species long-tailed weasel Date Dec 7, 1974 Time 10:30 am

Means of Identification tracks

Number Observed 1 ♂ ____ ♀ ____

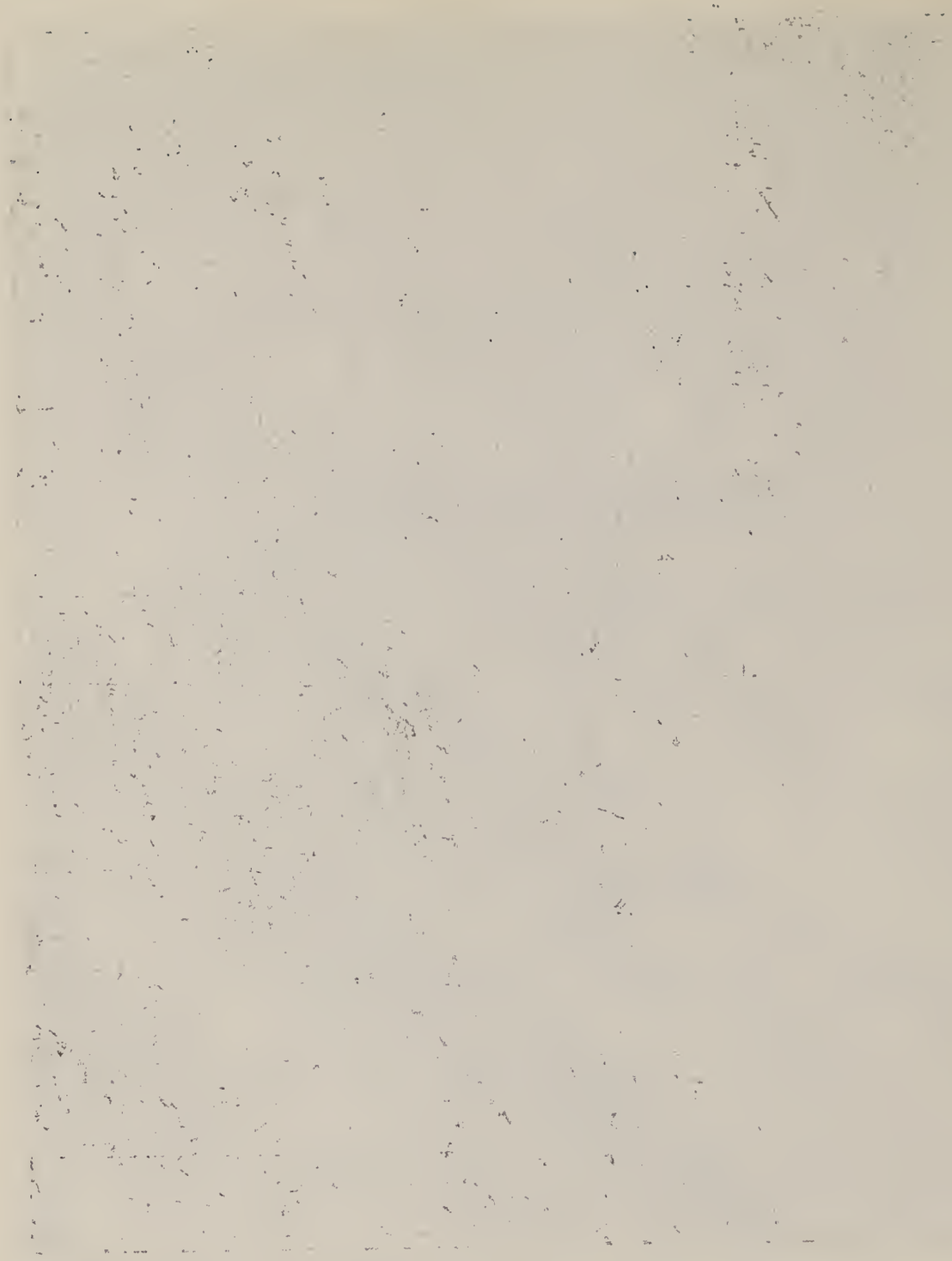
Adult ✓ Juv. ____

Habitat greasewood sage (on grid = A)

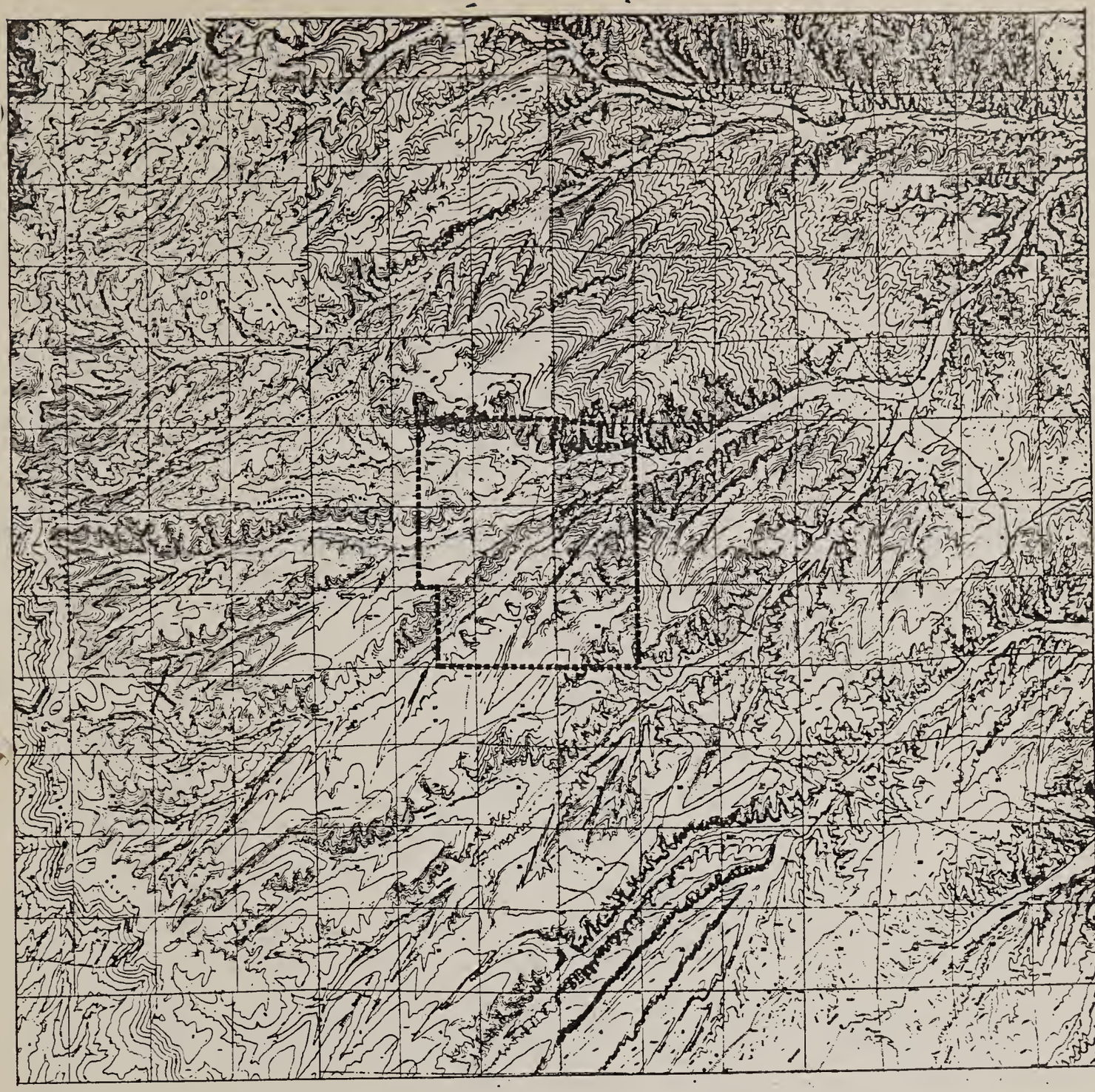
Other Information* ____

Observer Sorg - Elmwood

* Include any distinguishing field marks for horses.



FIELD OBSERVATIONS 14.1.3-30



Species Long tailed weasel Date 12/12/74 Time 9:20 a

Means of Identification Hanchart capture

Number Observed 1 ♂ ____ ♀ ____

Adult 1 Juv. ____

Habitat Sage-mixed brush

Other Information* black tip on tail - solid white otherwise

Observer Baker | Turner

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS 14.1.3 - 31



Species Long-tailed Weasel Date 12/8/74 Time —

Means of Identification tracks in snow

Number Observed _____ ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat grassy meadow

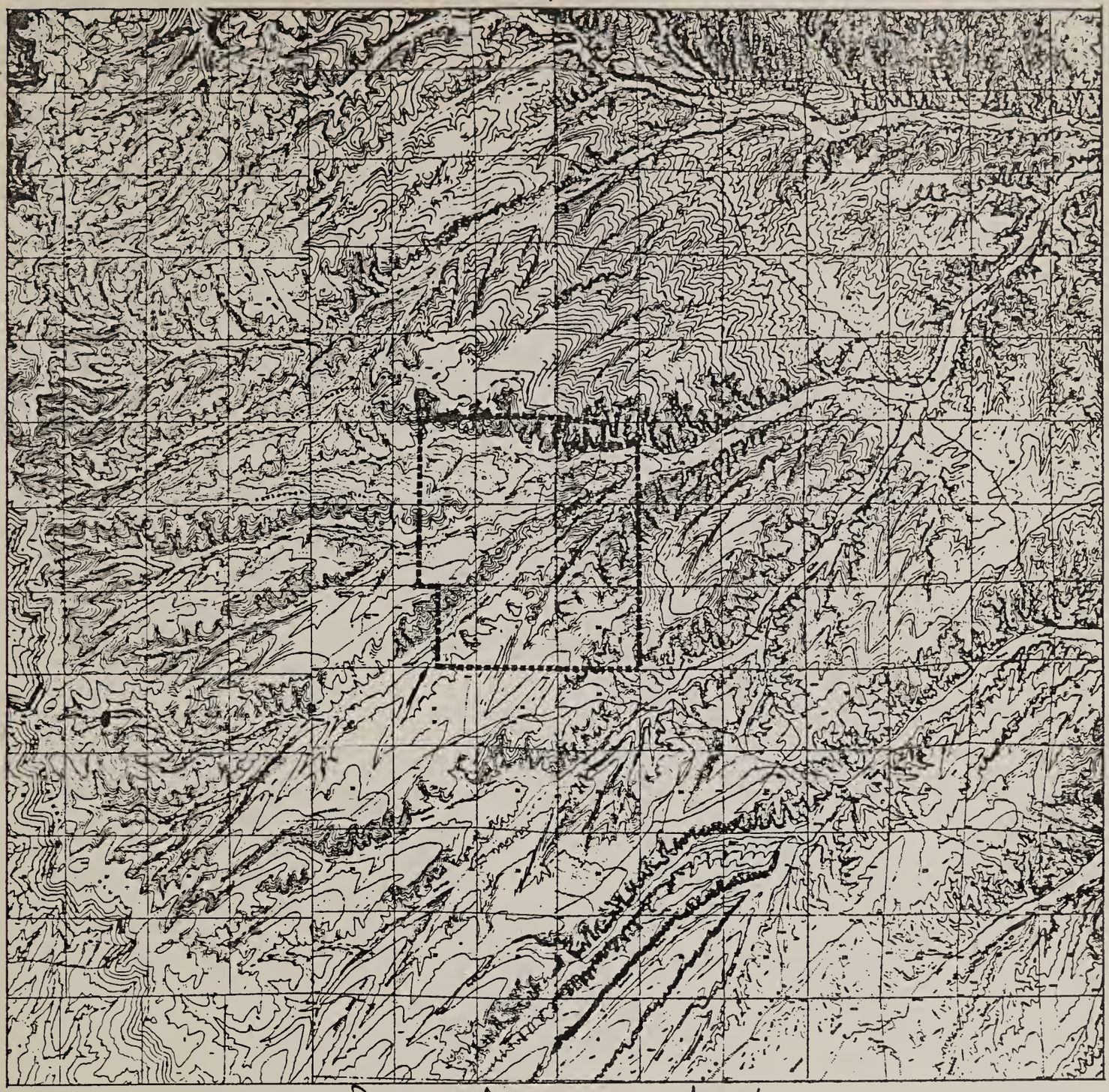
Other Information* Ridgetop Meadow Grid

Observer HB TT

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-32



Species Long-tail Weasel Date 12/8/74 Time —

Means of Identification tracks in snow

Number Observed — ♂ ♀

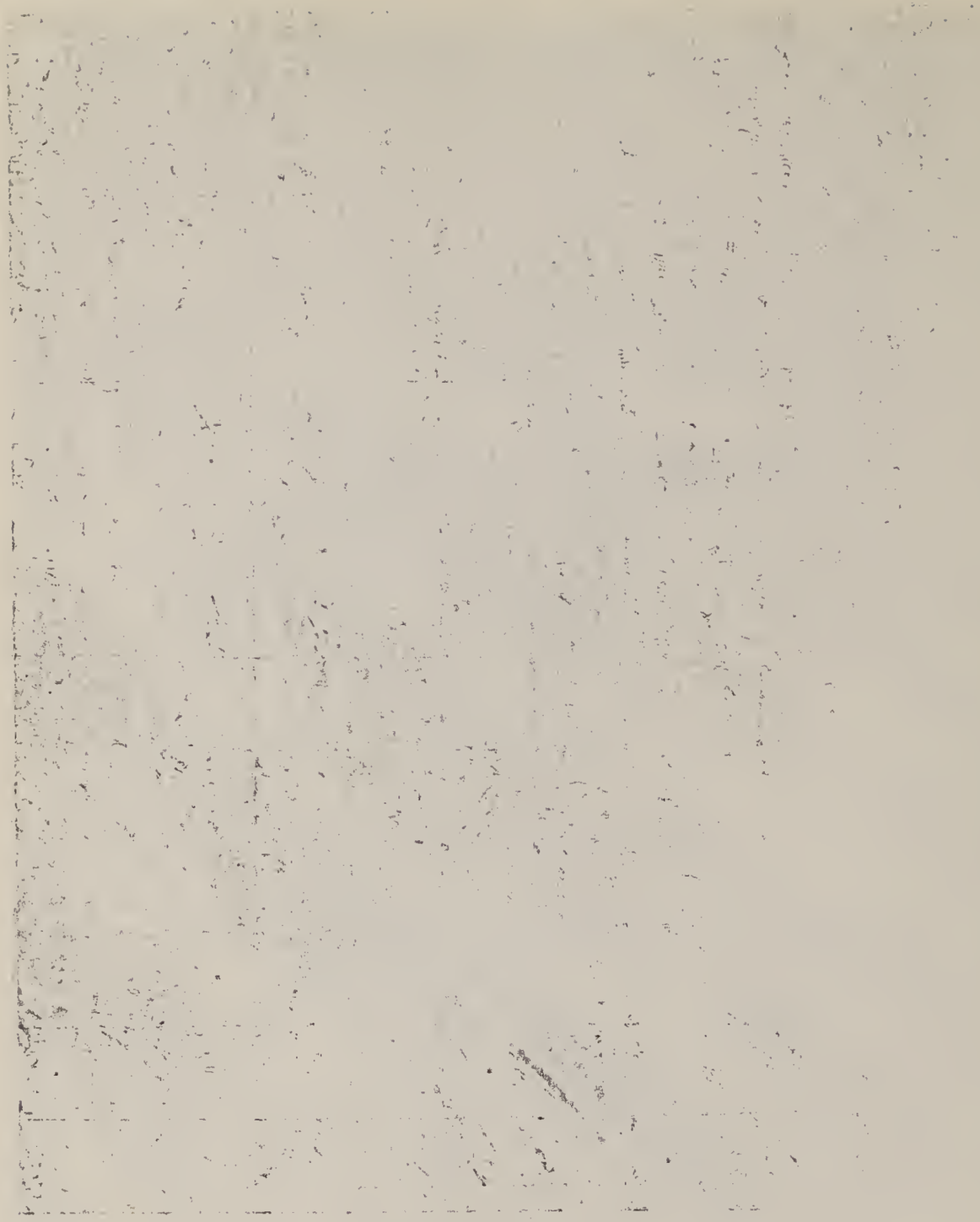
Adult Juv.

Habitat Douglas Fir

Other Information* Douglas Fir Grid.

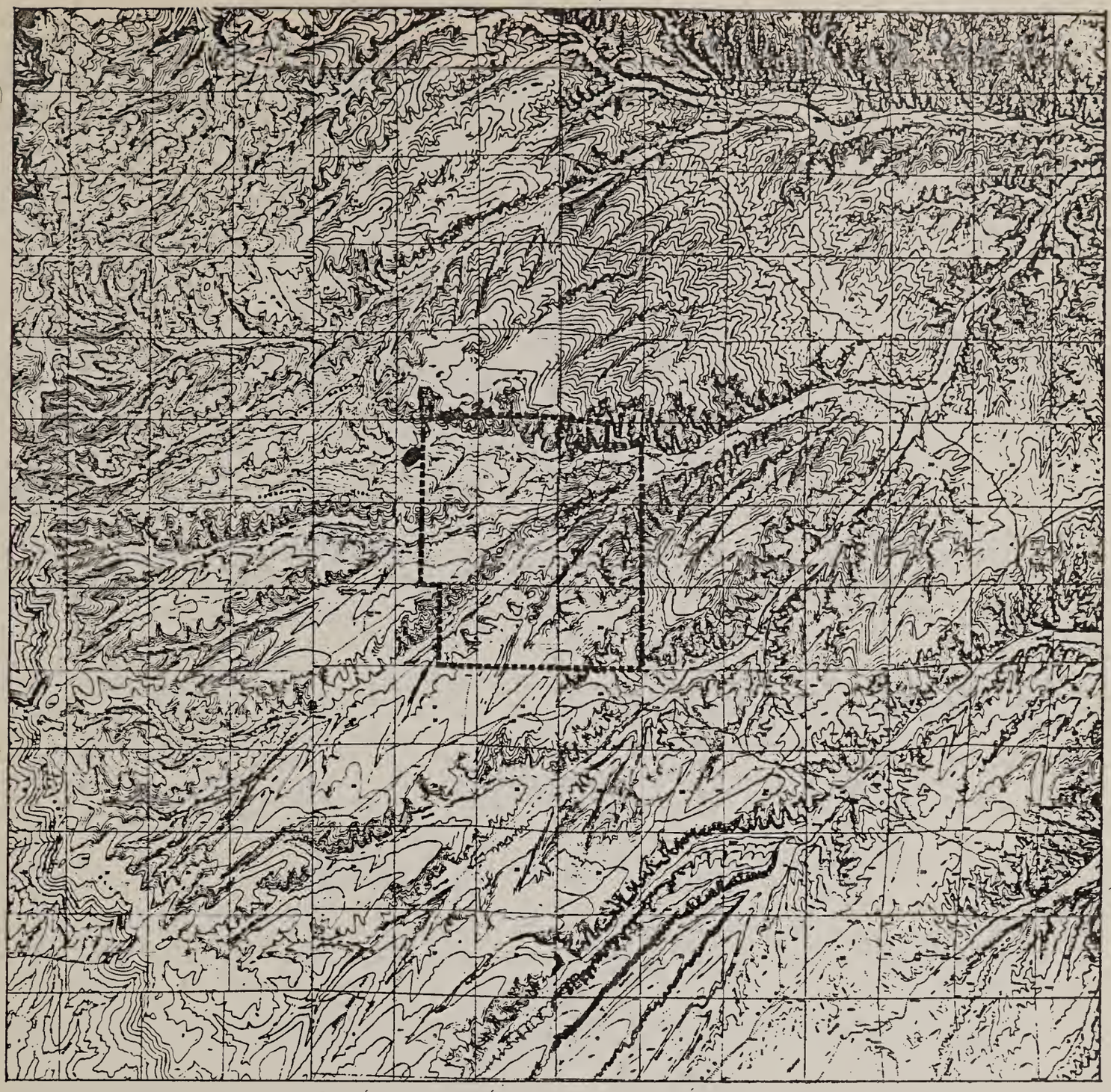
Observer HB - TT

* Include any distinguishing field marks for horses.



FIELD OBSERVATIONS

14.1.3-33



Species Weasel - ? Species Date 12/8/74 Time 1:30 PM

Means of Identification Tracks

Number Observed 1 ♂ — ♀ —

Adult ✓ Juv.

Habitat Mountain brush

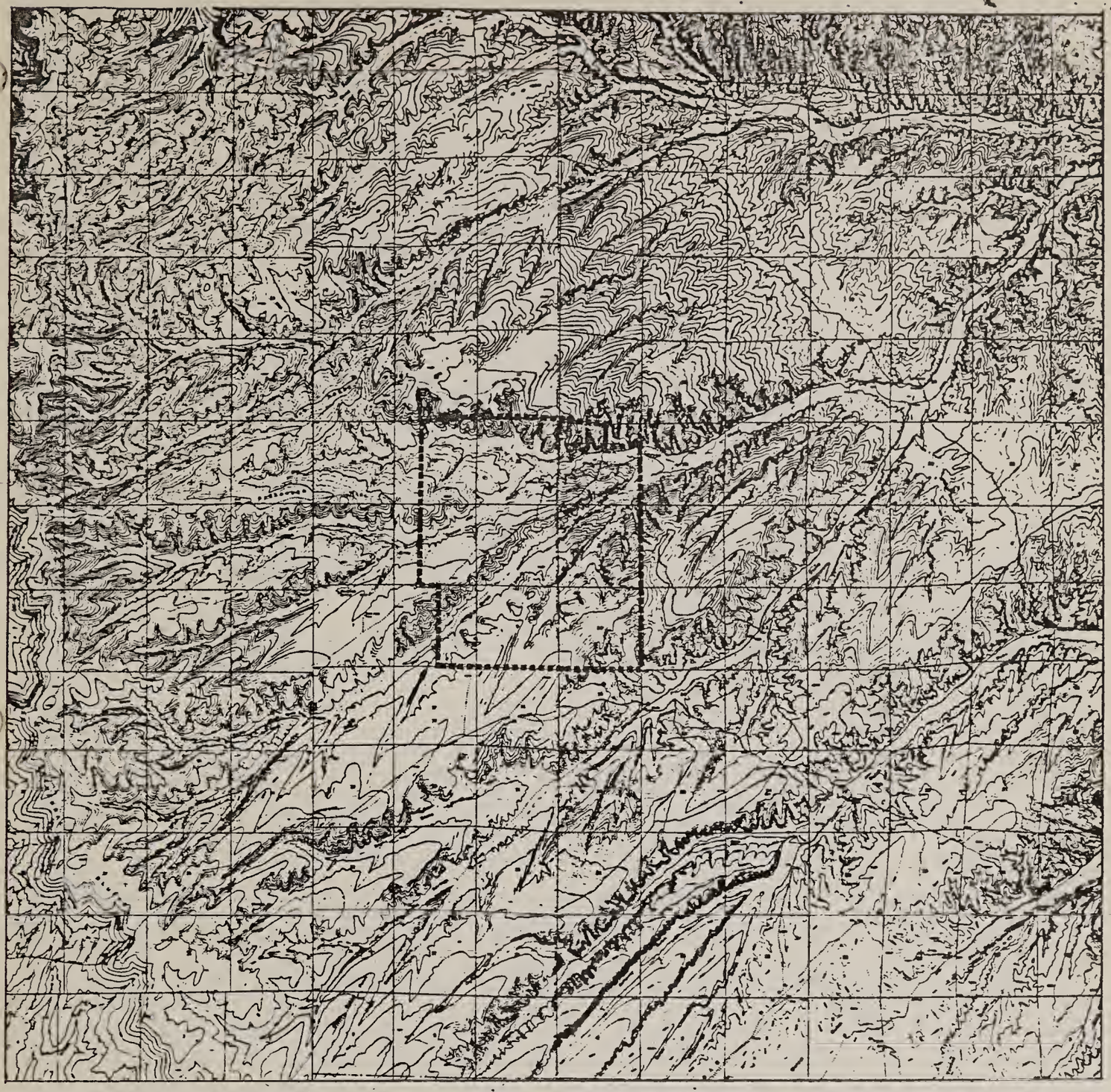
Other Information*

Observer Elmwood - Sawy

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.3-34



Species Long-tailed weasel Mustela frenata Date 12/16 Time 1:00

Means of Identification Tracks

Number Observed 1 ♂ ♀

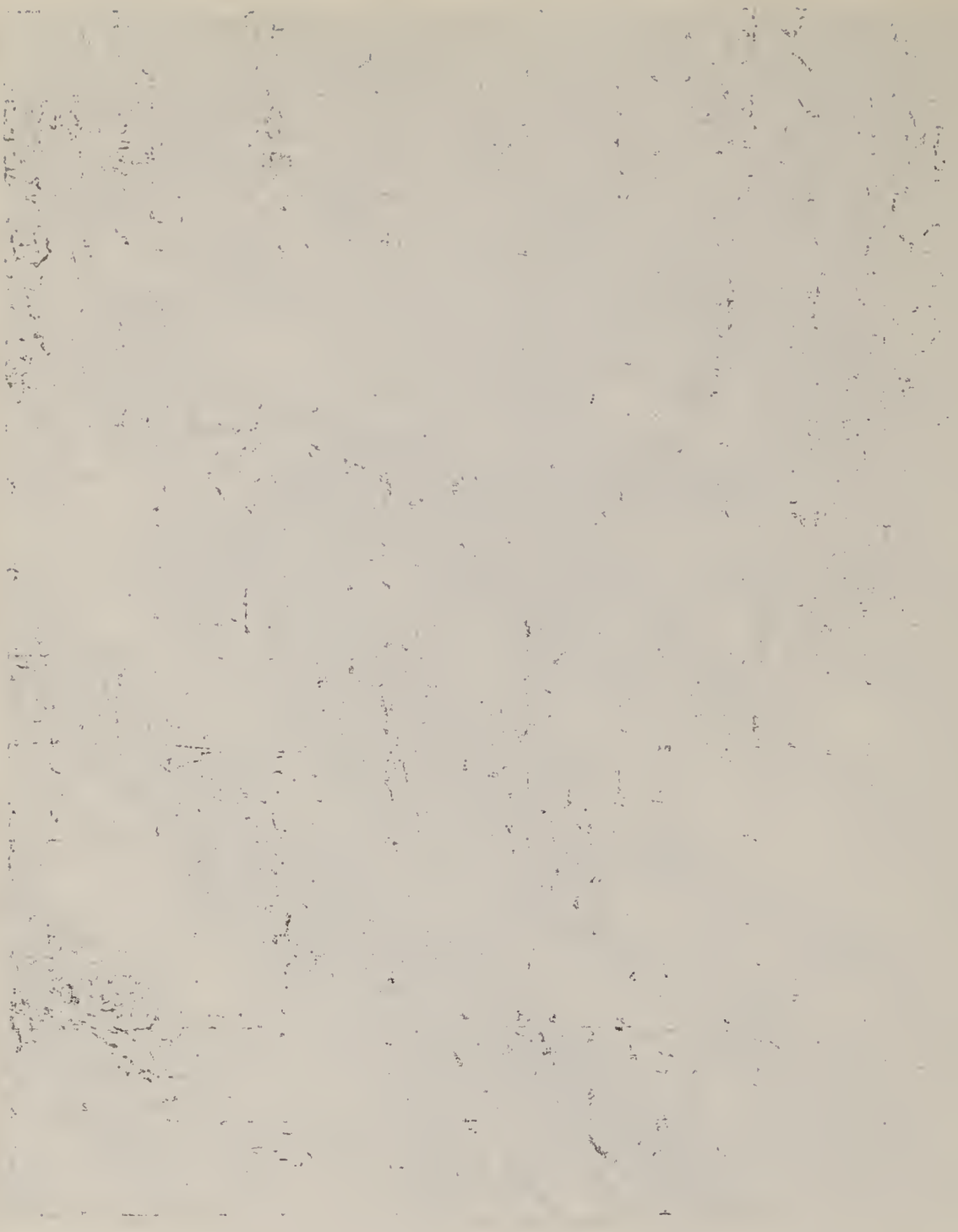
Adult Juv.

Habitat North facing P.J.

Other Information* Fresh tracks

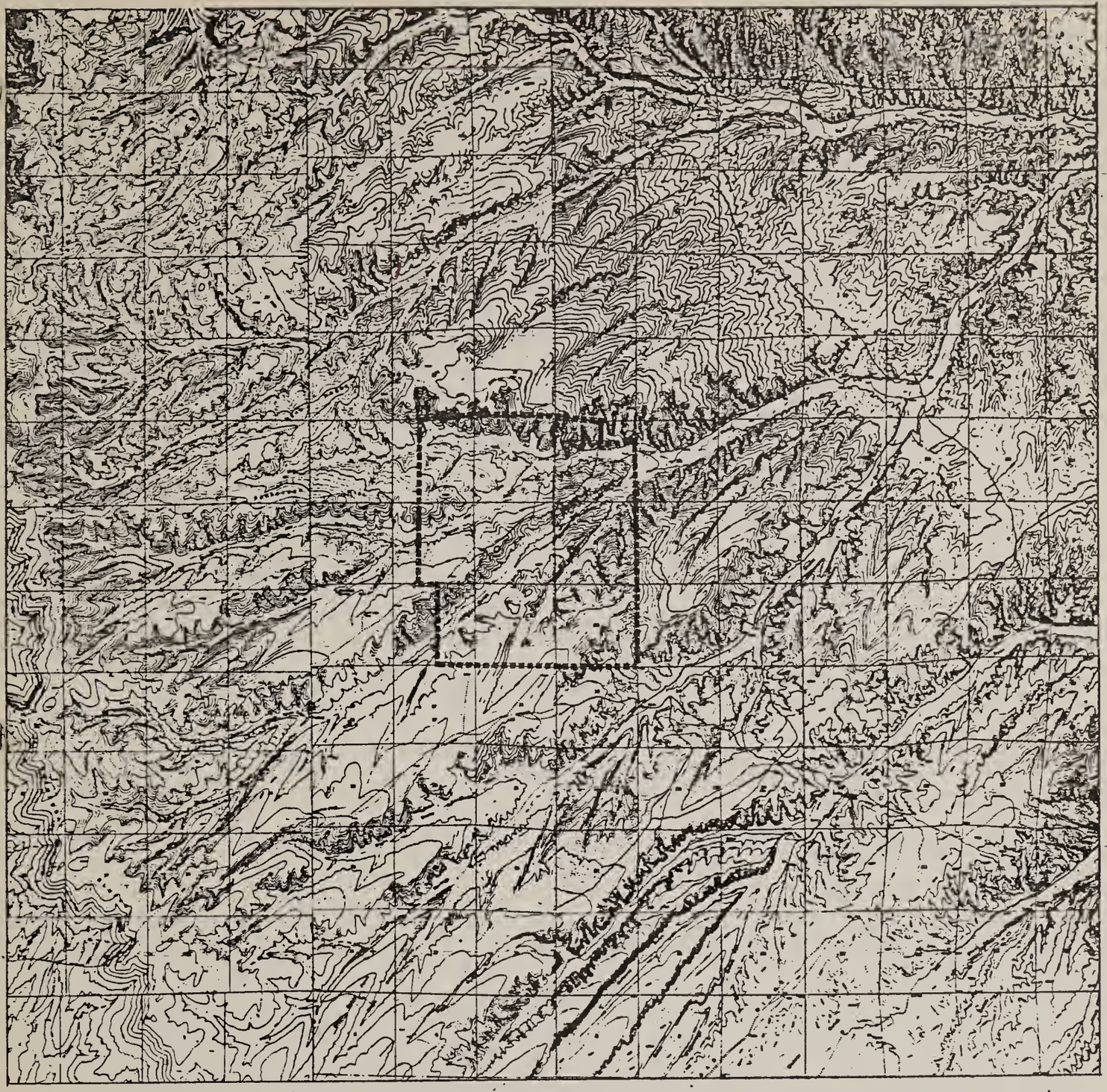
Observer J. Cascalosi

* Include any distinguishing field marks for horses.



FIELD OBSERVATIONS

14.1.3-35



Species Long-tailed Weasel Date 2/8-14/65 Time _____

Means of Identification tracks in snow

Number Observed _____ ♂ _____ ♀ _____

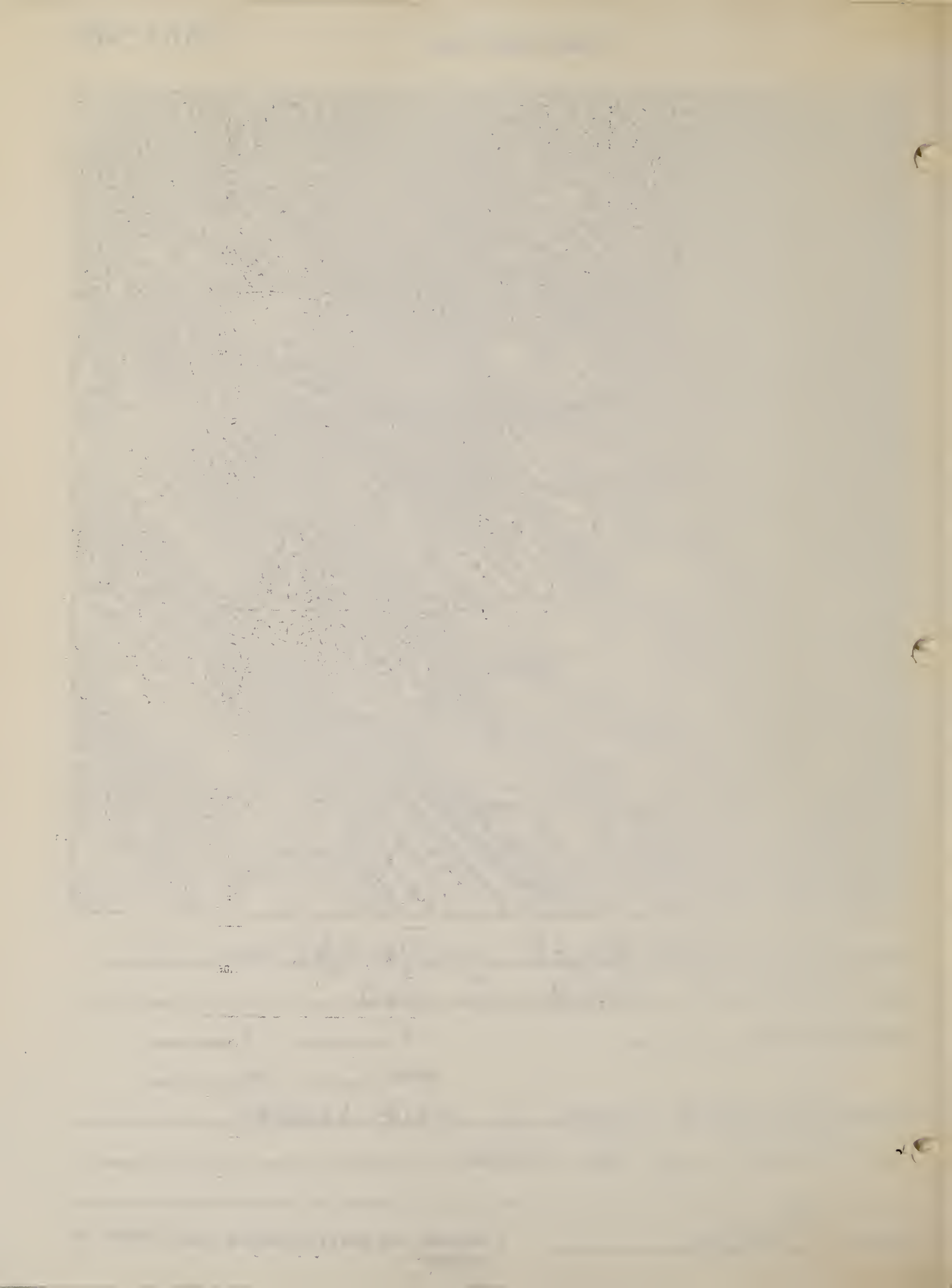
Adult _____ Juv. _____

Habitat Throughout area in moist habitats

Other Information* up to 8400

Observer Baker

* Include any distinguishing field marks for horses.



2.3.6. WINTER TRACK COUNTS

2.3.6.1. INTRODUCTION

Once each winter, snow track counts are being made to provide information on the distribution, relative abundance and habitat preference of big game, lagomorph, predator and small mammal species.

2.3.6.2. METHODS AND MATERIALS

Transects, 270 m (885.6 ft) in length, are established along one line of stations of the small mammal live trapping grids in each of the major vegetation types (Figure 14). Line A of the small grids (Figure 12) and line F of the large grids (Figures 11 and 13) are used for this purpose. All existing tracks are obliterated from each transect at a known date and time, either by a new snowfall or by sweeping tracks from the transect, leaving a cleared path at least 4 feet wide. No sooner than 22 hours after old tracks have been cleared, new tracks are identified and the number of crossings of each track type are counted and recorded on a field data form (Figure 32). The date and time the transect is surveyed will also be recorded and will not be more than 50 hours after the old tracks have been cleared. Track counts will be made in this way, twice each winter, and only those transects surveyed on the same day will be used for later interpretation. Transects will also be discounted if wind and new snow interfere with accurate identification and counting of tracks.

2.3.6.3. RESULTS AND DISCUSSION

Winter track counts were made on 8 transects within 7 vegetation types, between February 13 and February 21, 1975. Due to adverse weather conditions and inaccessible transect sites, certain days afforded incomplete results. The best results were obtained on February 16 and 19 when all eight transects were surveyed and snow and wind did not interfere. Therefore, the data from these two days will be used exclusively for interpretation.

Tracks of seven animal species were encountered on the eight transects on February 16 and 19. The results for each vegetation type are summarized

WINTER TRACK COUNT FIELD DATA SHEET 2.3.129

Date/Time_____ Transect Name/Number_____

Snow Condition_____

Date/Time of Last Snow or Erasure_____ Project_____ Observer_____

Species	Number of Crossings	Total Number of Crossings	Additional Notes*

*Track pattern, measurements, etc.

Figure 32. Winter track count field data sheet for the Rio Blanco Oil Shale Project.

in Table 21 which combines the data from the two days. These results do not compensate for differences in the time each transect was exposed. Table 22 provides more comparative results by using an index of relative abundance, which converts all figures from Table 21 to number of track crossings per 24 hours of transect exposure.

Mule deer tracks were encountered on four of the eight transects, with most occurring in north-facing pinyon-juniper associations. Cottontail tracks occurred on four transects and were most abundant in both bottomland greasewood-sage and south-facing pinyon-juniper. Only one chipmunk (Eutamias sp.) was recorded, in south-facing pinyon-juniper habitat. Mice (Peromyscus sp.) occurred on four of the transects in a variety of habitat types. Coyote (Canis latrans) tracks were recorded on four transects and were most abundant in the bottomland meadow. Only two sets of bobcat (Lynx rufus) tracks were observed, both side by side in south-facing pinyon-juniper. Weasels (Mustela sp.) occurred in rabbitbrush and mixed brush vegetation.

The three transects above 7200 feet (sagebrush, mixed brush, and upland meadow) had fewer recorded species and fewer numbers of track crossings.

2.3.6.4. SUMMARY AND CONCLUSIONS

Survey intensity was insufficient to produce conclusive results. However, general trends may be suggested.

The high track count of mule deer on Transect C would seem to indicate a preference for pinyon-juniper, however, none were encountered on Transect B, also in pinyon-juniper. This extreme difference between track occurrence may be explained by differences between the two sites. Transect B is on a steep south-facing slope while Transect C is on a more gentle north-facing slope. Near Transect B (≈ 150 m) and running parallel to it was a heavily used road, while the road near Transect C was unplowed. Cottontail tracks were most abundant in two distinct vegetation types. The distribution of mice as indicated by track counts seems consistant with December live trapping results which showed the variety of vegetation types that the deer mouse (Peromyscus maniculatus) may inhabit (Table 7). The high number of coyote tracks in the bottomland meadow may have produced a misleading index of

Table 21. Total number of track crossings of each species observed on winter track count transects for Rio Blanco Oil Shale Project, February 16 and 19, 1975

Species	Vegetation Type/Transect Number: Pinyon-Juniper (southern slope) B	Pinyon-Juniper (northern slope) C	Bottomland Meadow 1	Rabbitbrush 7	Greasewood Sage A	Sagebrush D	Mixed brush 11	Upland meadow 7	Totals
Mule deer (Odocoileus hemionus)	0	149	0	19	0	3	1	0	172
Cottontail (Sylvilagus sp.)	15	2	0	2	21	0	0	0	40
Chipmunk (Eutamias sp.)	1	0	0	0	0	0	0	0	1
Mouse (Peromyscus sp.)	4	0	4	9	0	0	0	2	19
Coyote (Canis latrans)	0	0	30	1	1	0	0	4	36
Bobcat (Lynx rufus)	2	0	0	0	0	0	0	0	2
Weasel (Mustela sp.)	0	0	0	2	0	0	1	0	3
TOTALS	22	151	34	33	22	3	2	6	273
Total number of hours each transect was exposed for tracks	88.5	76.5	74.0	75.0	75.0	96.5	76.5	99.5	

Table 22. Relative number of track crossings[1/] obtained from winter track counts for each species on each transect, for the Rio Blanco Oil Shale Project, February 16 and 19, 1975

Species	Vegetation Type/Transect Number								
	Pinyon-Juniper (southern slope) B	Pinyon-Juniper (northern slope) C	Bottom-land Meadow 1	Rabbit-brush 7	Grease-wood Sage A	Sage-brush D	Mixed brush 11	Upland meadow 7	Totals
Mule deer (Odocoileus hemionus)	0.00	46.75	0.00	6.08	0.00	0.75	0.31	0.00	53.89
Cottontail (Sylvilagus sp.)	4.07	0.63	0.00	0.64	6.72	0.00	0.00	0.00	12.05
Chipmunk (Eutamias sp.)	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Mouse (Peromyscus sp.)	1.08	0.00	1.30	2.88	0.00	0.00	0.00	0.48	5.72
Coyote (Canis latrans)	0.00	0.00	9.73	0.32	0.32	0.00	0.00	0.96	11.22
Bobcat (Lynx rufus)	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54
Weasel (Mustela sp.)	0.00	0.00	0.00	0.64	0.00	0.00	0.31	0.00	0.96
TOTALS	5.96	47.37	11.00	10.56	7.04	0.74	0.64	1.34	84.65
Total number of species	4	2	2	5	2	1	2	2	20

[1/] The relative abundance index is given by the formula $\frac{24T}{E}$, where T is total number of track crossings and E is total number of hours each transect was exposed for tracks. The result represents the number of track crossings for each transect per 24 hour period.

relative abundance because the same animal probably crossed the transect several times. However, this may indicate that the animal was spending considerable time searching for prey. Due to the lack of cover and the abundance of mice and voles (December live trapping results, Table 7), the bottomland meadow may be a prefered type hunting ground for coyotes. The weasel tracks encountered at both locations are most likely those of long-tailed weasels (Mustela frenata) which are expected to occur throughout the study area in a wide variety of habitats.

V. WINTER TRACK COUNTS

A. January, 1975 Counts (8.2.1)

WINTER TRACK COUNT FIELD DATA SHEET 8.2.1-1

Date/Time 2/12 1700 Transect Name/Number Bottom land Meadow 1

Snow Condition Last Crust 2/9

Project 23 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Coyote	2	2	
Deer Mouse	1	1	
Bird	1	1	(Raven ?)

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

S.2.1—2

Date/Time 2/13 1650 Transect Name/Number Bottom/Land Meadow 1

Snow Condition ~~Clear~~ Crust Tracks 2/12

Project 83 Observer V.L

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
NO TRACKS			
—	3		

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

8.21-3

Date/Time 2/13 1300 Transect Name/Number Sauge D

Snow Condition Light snow 2/9

Project 83 Observer J. C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Deer Mouse	1 1	2	

Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

8.2.1-4

Date/Time 2/13 1430 Transect Name/Number North P.J. / C

Snow Condition last snow 2/9

Project 83 Observer J.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Mule deer	4,12,6,5, 12,15,8,16,10,5,2,12	107	
Cottontail	2,1,2,1,1,1	9	

Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/13 1035 Transect Name/Number Greasewood / Sage A

Snow Condition Loose crust 2/9

Project 83 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Domestic Cattle	1	1	
Coyote		2	
Cottontail	1 1 2 1 1 1	7	

*Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET

8.2.1-6

Date/Time 2/14 1430 Transect Name/Number Mountain branch II

Snow Condition 16-7 inches 2/9

Project 83 Observer J.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Mule Deer	1	1	old track)

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/17 0900 Transect Name/Number North P-J /c

Snow Condition Icy crust 2/16 2130 2"4" powder

Project 83 Observer J L

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Mule Deer	3, 2, 3, 4, 2, 1	15	
Bobtail	11	2	
Weasel	11	2	

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

8.2.1-8

Date/Time 2/17 1030 Transect Name/Number Rabbitbrush /7

Snow Condition light wind 2/14 2130 3-4" powder

Project #3 Observer J. C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Coyote	1 2 1 2	6	
Mule Deer	1 11	#3	
Weasel	1 1	2	

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET 8.2.1 — 9

Date/Time 2/17 0800 Transect Name/Number Greasewood / Sage A

Snow Condition last snow 2/16 2130 3½" powder

Project 83 Observer J. C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Bobcat	1 1	2	
Coyote	1 1 2 1	5	

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET 8.2.1-10

Date/Time 2/17 1430 Transect Name/Number Trent Mountain Brush 11

Snow Condition Icy Skins 2/16 2130 3-4" powder

Project 83 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Lynx canadensis	1	1	

*Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET

8.2.1 E 11

Date/Time 2/17 0830 Transect Name/Number Bottomland Meadow 1

Snow Condition Icy + crusty 2/16 2130 3"+ powder

Project 83 Observer J.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Deer Mouse	1 11	3	
Bird (Marsh Hawk?)	1	1	

Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/20 1130 Transect Name/Number South P-J B.

Snow Condition Sunny Cold wind night before (2/19) circa

Project 83 Observer J. C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
NO TRACKS			

*Track pattern, measurements, etc.

8.2.1-12

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/20 1700 Transect Name/Number Sage, D

Snow Condition Sunny, recent high wind/ night before (2/19) high wind reading

Project 83 Observer J. C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
NO TRACKS			

Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/20 1615 Transect Name/Number Upland Meadow /9

Snow Condition snow and high (wind) wight below 12.15) high winds

Project 83 Observer JC thrown last day

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
	No tracks		
	on transect		

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/20 1030 Transect Name/Number North T-J / C

Snow Condition (rain) and wind night before (2-19) area somewhat protected

Project 83 Observer J. C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Mule deer	1 1 1 1 2 1	9	

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/20 1100 Transect Name/Number Rabbitbrush 17

Snow Condition Snow and high winds last night (2/19) high wind today

Project 83 Observer JC

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Mountain	1	1	
Deer Mouse	1 1 1 2 1	7	
Coyote	2 1 1	4	

*Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET 8.2.1—11

Date/Time 2/20 0915 Transect Name/Number Grea is wood/Scrub A

Snow Condition Dense crust wind 10-17 mi/hr (2/15) windy Looking

Project 83 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Cottontail	1 1111	5	
Coyote	111	3	

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

8.2.1-10

Date/Time 2/20 1245 Transect Name/Number Mountain Branch 11

Snow Condition [illegible] and wind 1/2 inch (2/16), area somewhat protected

Project 83 Observer J.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
(NO TRACK)			

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET 8.2.1 — 19

Date/Time 2/20 0900 Transect Name/Number Bottomland Meadow 1

Snow Condition crust and wind last night 1/2 inch windy today

Project 83 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Coyote	2 2 1	5	
Vole	1	1	

*Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/21 1100 Transect Name/Number Rabbit brnch 7

Snow Condition last evening 2/20 1100

Project 23 Observer V.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Mule Deer	1121	5	

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/21 1030 Transect Name/Number Greenwood/Dale A

Snow Condition last erasure 2/20 0915.

Project 83 Observer N.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Ptarmigan	1 1 1 2 1	6	

Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/21 0830 Transect Name/Number Bottom land Meadow

Snow Condition last ground 2/20 · 0900

Project 83 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Coyote	1 1	2	
Deer Mouse	1 1	2	

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/16 1000 Transect Name/Number South P.J. / B

Snow Condition Snowed night and morning before, ended 0800 2/15

Project 83 Observer J.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Sylvilagus sp.	111	3	
Peromyscus sp.	1	1	

*Track pattern, measurements, etc.

C-8.I.1.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/16 1100 Transect Name/Number North P.J C

Snow Condition snow morning and night before ended 0800 2/15

Project 83 Observer J.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Odocoileus hemionus	8, 12, 15, 12, 14, 21, 20, 5	107	difficult to get exact count

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/16 1130 Transect Name/Number Rabbitbrush 17

Snow Condition snowed heavily day before ended 0800 2/15

Project 83 Observer JC

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Sylvilagus sp.	11	2	
Canis latrans	11	2	
Peromyscus sp.	~~HHT~~ IIII	9	
Mustela frenata	11	2	

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

8.2.1 – 26

Date/Time 2/16 0830 Transect Name/Number Boffmeland Meadow/1

Snow Condition new snow night and morning before, ended 0800 2/15

Project E3 Observer EJC

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Canis latrans	2, 1, 1, 1, 2, 1, 1, 21	11	
Peromyscus sp.	1 1 1	3	

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/16 0930 Transect Name/Number Greasewood/Sage A

Snow Condition Snow ~~event~~ night and morning before, ended 0800 2/15

Project 83 Observer JC

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Sylvilagus sp.	2 4 1 1 2 3 2 2	17	
Canis latrans	1	1	

*Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/16 1330 Transect Name/Number Tract Mountain Brush / 11

Snow Condition Snow night and morning before, ended 0200 2/15

Project 23 Observer J. C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
D. hemionus	1	1	

*Track pattern, measurements, etc.

8.2.1 – 21

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/16 1545 Transect Name/Number Sage D

Snow Condition snowed night and morning before, ended 0800 2/15

Project 83 Observer J.C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
O. hemionus	111	3	

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/16 1715 Transect Name/Number Upland Meadow /9

Snow Condition Snow morning and night before ended 0400 2/15

Project F3 Observer JC

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
NO TRACKS			

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/14 1200 Transect Name/Number South P.J / B

Snow Condition Icy / Crust 2/16 2130

Project ES Observer J. C.

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Cottontail	1, 2 1.1 2, 1121	12	
Bird (jay?)	3 2 1	6	
Deer Mouse	1 1 1	3	
Bobcat	2	2	
Chipmunk	1	1	

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/19 1030 Transect Name/Number North P-J 1C

Snow Condition light crusting 2/17 0900

Project ES3 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Mule deer	4,5,10,8,8,4,3	42	
Cottontail	1,1	2	

Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/19 1100 Transect Name/Number Rabbitbrush 17

Snow Condition 16" crust enclosure 2/17 1030

Project E3 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Mule Deer	19	19	
Coyote	1	1	

*Track pattern, measurements, etc.

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WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/19 0830 Transect Name/Number Bottomland Meadow 1

Snow Condition last measure 2/17 0830

Project S3 Observer JC

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
C. latrans	2, 2, 1, 2, 2, 1, 1, 2, 4, 2	19	
Peromyscus sp.	1	1	

*Track pattern, measurements, etc.

WINTER TRACK COUNT FIELD DATA SHEET

8.2.1 — 32

Date/Time 2/19 0920 Transect Name/Number Greenswood/Seg A

Snow Condition 16-t crasmc 2/17 0800

Project 83 Observer J. C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Ptarmigan	1 1 1 1	4	

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/19 1430 Transect Name/Number Front Mountain Bench / 11

Snow Condition last erosure 2/17 1430

Project 83 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Weasel	1	1	

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

8.2.1-31

Date/Time 2/19 1400 Transect Name/Number Jage, D

Snow Condition last snow ~~2/17~~ 2/16 2130

Project E3 Observer J C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
NO TRACKS			

*Track pattern, measurements, etc.

ECI

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/19 1600 Transect Name/Number Upland Meadow 19

Snow Condition Icy surface 2/16 2130

Project 83 Observer J.C

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Coyote	1 2 1	4	
Deer Mouse	1 1	2	

*Track pattern, measurements, etc.

8.2.1-37

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/17 1045-1130 Transect Name/Number Boothill Sage

Snow Condition

Date/Time of Last Snow or Erasure 2/16 2130 Project 83 Observer DVH

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Coyote		2	
Cottontail		1	

*Track pattern, measurements, etc.

8.2.1-40

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/19 1625-1735 Transect Name/Number Cat Road P-J

Snow Condition

Date/Time of Last Snow or Erasure 2/16 2130 Project 83 Observer DVH

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Weasel		2	
Cottontail		6	
Coyote		6	

*Track pattern, measurements, etc.

8.2.1-A1

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/20 1110-1205 Transect Name/Number Ridgetop Meadow

Snow Condition snow and high winds

Date/Time of Last Snow or Erasure ... Project 83 Observer DVH

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Snowshoe hare		3	

*Track pattern, measurements, etc.

ECI

8.2.1-42

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/19 1500-1550 Transect Name/Number Sage / P-J

Snow Condition

Date/Time of Last Snow or Erasure 2/16 2130 Project 23 Observer DVH

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Weasel		2	
Cottontail		3	

*Track pattern, measurements, etc.

8.2.1 – 43

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/20 1610-1700 Transect Name/Number Aspen

Snow Condition snow crust wind

Date/Time of Last Snow or Erasure — Project 83 Observer DVH

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Snowshoe hare		2	
Cottontail		1	
Weasel		1	

*Track pattern, measurements, etc.

8.2.1 - 44

WINTER TRACK COUNT FIELD DATA SHEET

Date/Time 2/20 1450-1555 Transect Name/Number Doug Fir

Snow Condition Cold and Wind

Date/Time of Last Snow or Erasure — Project 83 Observer DVH

Species	Number of Crossings	Total Number of Crossings	Additional Notes*
Weasel		2	
Coyote		7 or 8	

*Track pattern, measurements, etc.

ECI

2.3.7. AVIFAUNA

2.3.7.1. INTRODUCTION

The purpose of the avian census program is to identify the bird species that occur within the study area on a seasonal and annual basis, to determine their density in and use of dominant habitats, and to develop an objective designation of important species. The importance of avian species may be determined by demonstrating recreational value, economic impacts, rare or endangered status, esthetic value or a critical role in the structure and function of the ecosystem. Habitat preferences and favored nesting habitats of breeding species are to be indicated.

2.3.7.2. METHODS AND MATERIALS

2.3.7.2.1. General Avifauna

Quantitative censuses of bird species residing in or utilizing major vegetation types on Tract C-a and adjacent areas commenced in early October, 1974 and shall continue on a bimonthly basis through August 1976. During the 12 field periods, 20 separate censuses are conducted. All except the riparian census route either start at or traverse through one of the small mammal live trapping grids (Figure 14).

The Emlen strip census procedure (Emlen, 1971) is being used to provide data from which bird densities can be calculated. Censuses are conducted during a 3.5 hour period immediately after sunrise and just before sunset during each day of every sampling period. The technique consists of walking through a strip approximately 800 m (2,624 ft) long and 122 m (400 ft) wide and recording all individual birds seen and heard, by species, according to their perpendicular distance from the transect on a standard field data form (Figure 33). These distances are later used to calculate species coefficients of detectability, an adjustment factor necessary to provide more accurate density estimates for all species observed. A hand-held rangefinder is used to verify perpendicular density estimates. The length of each transect is determined by measuring the route plot on USGS topographic maps and converting the length to meters.

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date:_____ Observer:_____ Site:_____

Times:_____ Temp.:_____ Wind:_____ Sky:_____

Project:_____ Other Comments:_____

Number Recorded Per Strip

Species 1/	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

1/ Species are recorded by common name or a four letter code based on the first two letters of the generic name and the first two letters of the species name.

Figure 33. Emlen strip census field data sheet for the Rio Blanco Oil Shale Project.

While the Emlen technique provides data on species utilizing the surveyed areas, it does not identify the full range of species expected throughout the entire area of investigation. Past experience and information obtained from this and other ECI research projects in the Piceance Basin suggest that the bird species inventory may be very incomplete if sole reliance is placed upon the relatively few Emlen censuses which can be performed at dawn and dusk.

Therefore, standardized qualitative count surveys are used to indicate and document the bird species inhabiting the major variants of predominant vegetation types. Such surveys are conducted during each general avifauna sampling period. A qualitative count survey consists of walking a transect approximately 250 m (820 ft) long and recording all birds encountered, by species and numbers, on a field data form (Figure 34). Quantification in these surveys is less rigorous than for standard Emlen transects and they may be run in daytime periods of low bird activity. Thus quantitative comparisons between these qualitative surveys or with Emlen transect data are not usually reliable. Nonetheless, the qualitative surveys serve important functions in more adequately assessing species diversity in each vegetation type and providing a more complete qualitative picture of bird species distribution.

When active nests are discovered during any field activity, the nest is examined and the species, nest type, nest substrate, rim height of nest, and nest location in relation to nearby landmarks are recorded on a field data sheet (Figure 35). The number of eggs and/or nestlings present and estimated age of nestlings, based on criteria presented by the Western Bird Banding Association's banding work sheets, are also recorded. These data will indicate specific habitat preferences of bird species found nesting in the study area.

Emlen strip surveys are not interrupted to obtain data on nests. This reduces the possibility of recording birds already tallied. Rather, the nests' location is marked with surveyer's flagging tape and examined after the Emlen survey is completed. Nests discovered during qualitative counts, upland gamebird, waterfowl and raptor investigations are examined upon discovery.

QUALITATIVE AVIAN RECORD

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Date_____ Observer_____ Project_____

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind

AVIAN NESTING RECORD

ecology consultants, inc.

Species _____ Site _____ Nest No. _____

Date _____ Observer _____ Project _____

Nest Location

Nest Type _____

Substrate _____

Rim height (cm) _____

Comments:

← Sketch in nest location relative to identifiable landscape features, grid system, or vegetation pattern.

Date	Eggs	Nestlings	Age	Comments

Summary: Clutch size _____ Completed? _____ Date Incubation Started _____

Young Hatched _____ Hatching Date _____

Young Fledged _____ Fledging Date _____

Nest Destroyed? _____ Date _____ Cause _____

Figure 35. Avian nesting record field data sheet for the Rio Blanco Oil Shale Project.

2.3.7.2.2. Upland Gamebirds

Sage grouse seen during the Emlen strip censuses and observations made during other field activities, including aerial flights, will help identify and locate sage grouse leks (mating display grounds). These are plotted on maps and designated as approximate nesting locations, since approximately 80 percent of all sage grouse nests are found within a 5.65 km (3.5 mi) radius of a strutting ground and in association with the sagebrush vegetation type (Gill, 1965; Martin, 1970; Autenrieth, 1969, 1970).

To investigate sage grouse nesting success a 20-mile brood census route through sagebrush habitat (Patterson, 1952; Rogers, 1964) is traversed on roads through Tract C-a and adjacent areas on two consecutive mornings during mid-July, 1975 and 1976. The census route is traveled in a 4-wheel-drive vehicle driven at less than 32 km (20 mi) per hour. When sage grouse are encountered on the route they are flushed and birds tallied according to sex and age. Criteria for sexing and aging are based on data presented by Rogers (1964). The specific location of the brood census route and the final design of the brood count program will be developed in consultation with Colorado Division of Wildlife personnel, after evaluation of areas of sage grouse concentration. Designated concentration areas are based on observations of more than three birds seen or flushed at any one time.

Blue grouse are censused once between the first and last week of May 1975, 1976. This period represents the height of their displaying season (Rogers, 1968; Mussehl, 1960). The species favors open confier-aspen stands or areas where conifers and shrubs are intermixed (Rogers, 1968). Therefore, these vegetation types, found only in the area of Cathedral Bluffs, are traversed for two consecutive mornings to make blue grouse counts. These surveys, approximately 24.2 km (15 mi) in length, commence at daybreak and continue for 3 hours after sunrise. Stops are made at each appropriate vegetation site and all grouse heard displaying are recorded.

Rogers (1968) in discussing the Dusky blue grouse, states that they hoot while displaying, while Braun (Personal communication) suggests that the only audible activity performed is the flutter display. Therefore, audible detection of either

display activity is used to indicate the presence of blue grouse. Display locations are plotted on field maps (Figure 25) and identified as probable nesting areas for this species. They are revisited during August and all flocks located are flushed and young-to-adult ratios recorded.

The chukar, if it is now present in the vicinity of Tract C-a, should be documented during the 12 field sampling periods. If found, road transects are made in mid-May in appropriate areas to record number of chukar calls. Also, road counts are made in mid-July to determine young-to-adult ratios. Criteria for aging is based on information presented by Galbreath and Moreland (1953), Petrides (1951) and Aldrich (1947).

Density of mourning doves, likely inhabitants of all vegetation communities on the tract and the surrounding area, is determined from Emlen transect counts.

2.3.7.2.3. Waterfowl

A waterfowl census program was initiated during October 1974 and continues in April, June, August and October, 1975, and April, June and August, 1976. During each census period, the Stake Springs Draw impoundment, located in the NW 1/4 of Section 14, T 2S, R99W, is visited during early morning, mid day and early evening for a minimum of two days to determine the extent of utilization by migratory or breeding waterfowl. Observations are made from a position 200 m (656 ft) south of the impoundment. This position provides unrestricted visibility and minimizes possible disturbance of the pond by the observer. The pond is observed for a minimum of 15 minutes during each of the three visits. Each bird observed on the pond is identified to species and number of individuals per species is recorded on a standard field form (Figure 36).

2.3.7.2.4. Raptors

Raptorial birds include the vultures, hawks, eagles, falcons and the owls. Also included in this category, due to its similar ecological role, is the common raven (Craighead and Craighead, 1969).

WATERFOWL COUNT RESULTS - FIELD DATA FORM 2.3.141

Project_____ Date_____ Observer_____

Field_____ Time_____ Wind_____ Temp_____

Percent Sky Overcast_____ Comments_____

Species	Number Observed M	F	Juv	Notes

Figure 36. Waterfowl count results field data sheet for the Rio Blanco Oil Shale Project.

Aerial Surveys

Low level aerial surveys are being made to determine relative abundance and distribution of raptors utilizing or residing in the vicinity of Tract C-a. These flights were initiated in November, 1974 and continue in conjunction with big game aerial surveys scheduled for March, May, June, and August, 1975 and 1976, October, 1975 and January, 1976. Flights employ a high-winged Cessna aircraft designed to permit slow flight speeds at low levels above the ground. The plane is flown along standardized transects at as near to an air speed of 129.0 km (80 mi) per hour, approximately 60 m (196.8 ft) above the ground, as safety will allow. During each census flight, the flight paths (transects), speed and altitude of the aircraft are duplicated as much as weather conditions will permit.

To allow continuous observation of the transect, portable tape recorders are used to record information during the census. Raptors seen by the pilot and two observers (positioned on opposite sides of the plane) are identified to species, location, and where possible, age class. Prior to the initiation of the census, each observer identifies the category of information to be recorded (i.e., Aerial Raptor Survey), the date, area to be surveyed, his name and observation position in the aircraft, the name and position of the other observer, name of pilot and make of aircraft on the tape. Weather conditions such as temperature, estimated wind speed and direction, and cloud cover are also recorded. The time is recorded at the beginning of the first transect and at the end of the last transect. Observations are made through a standard flight view panel that allows each observer a view of 0.81 km (0.5 mi) in width on each side of the aircraft. The information recorded on the tape is transcribed by each observer onto a standard aerial raptor census report and summary form (Figure 37).

Aerial surveys cover likely raptor activity and nesting areas on Tract C-a and adjacent areas (Figure 38). These areas have been determined by ground investigations and related scientific literature on habitat requirements of species known to utilize Piceance Basin during migration and breeding (Wolfe, 1928; Enderson, 1964; McGahan, 1968; White, 1969; Murphy et al., 1969; Ogden, 1971, 1972; Platt, 1971; Porter and White, 1973; and Smith and Murphy, 1973).

AERIAL RAPTOR CENSUS REPORT AND SUMMARY FORM 2.3.143

Project/Study_____ Date Flown_____ Survey Area_____

Observers: R_____ L_____ Pilot/Aircraft_____

Time: Start_____ Finish_____ Est. Ground Speed_____ Altitude_____

Weather: Temperature_____ Wind_____ Percent Cloud Cover_____

Air_____ Light_____ Analyst_____

Species	Number			Location			Notes and Comments
	Adlt.	Imm.	Unkn.	Section	Town.	Range	

Figure 37. Aerial raptor census report and summary form for the Rio Blanco Oil Shale Project.

ECI ecology consultants, inc.

R. 100 W R. 99 W

R. 99 W R. 98 W

T 1 S
T 2 S

T 2 S
T 3 S

A

B

C

D

E

F

G

H

I

J

START

STOP

14 13 12 11 10 9 8 7 6 5 4 3 2 1

TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

RAPTOR SURVEY

..... north-south raptor transects (aerial)

——— major canyon raptor transects (aerial)

••••••••••• owl night count transects (ground)

0 1/2 1 2 miles

NORTH

ECI
ECOLOGY CONSULTANTS INC.
Fort Collins, Colorado

R. 100 W. R. 99 W.

R. 99 W. R. 98 W.

A

B

C

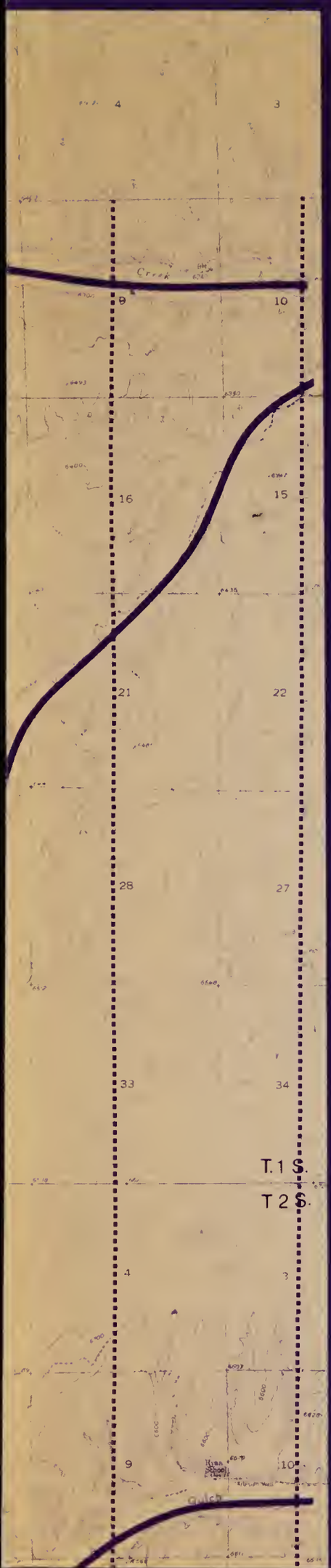
START

STOP

CATHEDRAL BLUFFS

DEAD HORSE RIDGE

SAGEBRUSH HILL



TERRESTRIAL ECOLOGICAL INVESTIGATIONS

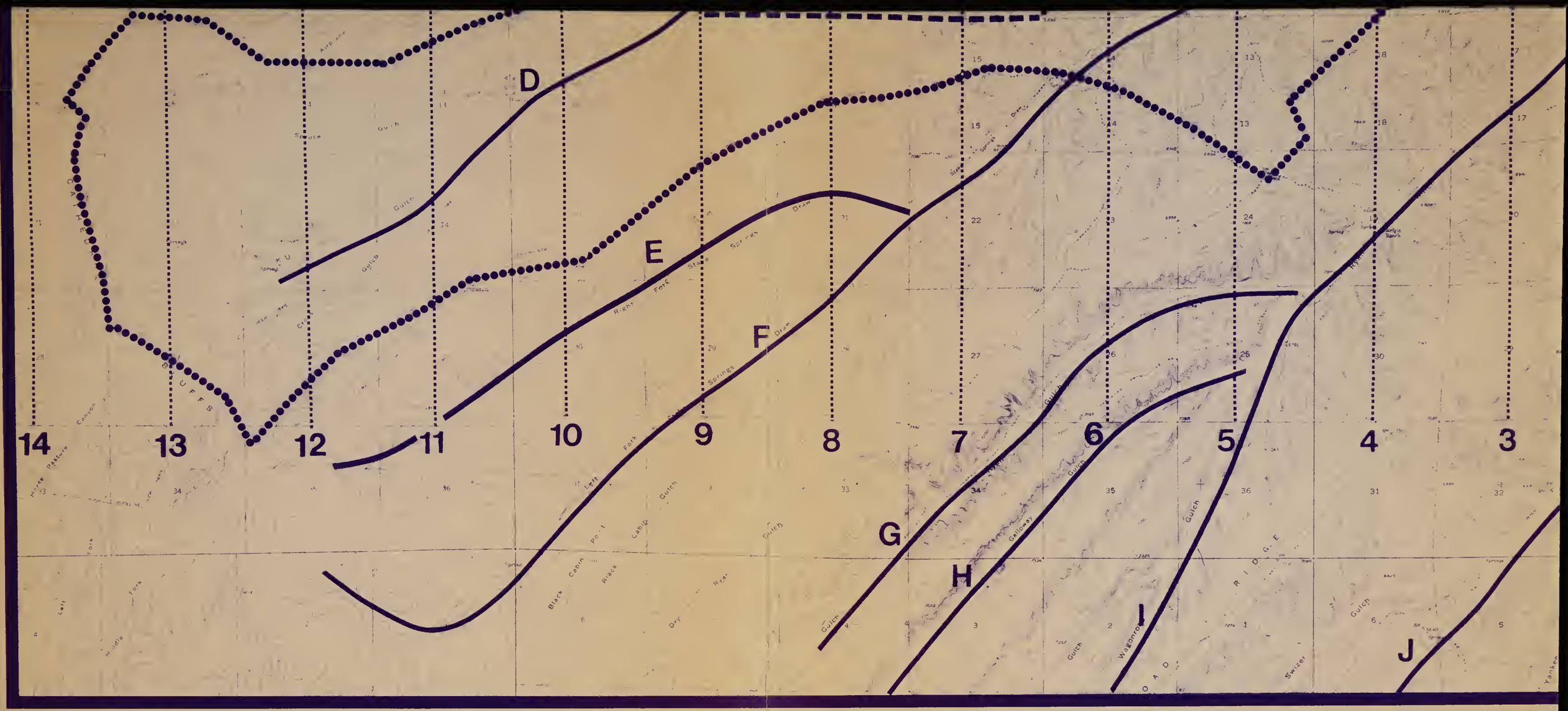
RIO BLANCO OIL SHALE PROJECT

RAPTOR SURVEY

..... north-south raptor transects (aerial)

_____ major canyon raptor transects (aerial)

••••••••••• owl night count transects (ground)


D
E
F
G
H
I
J
14
13
12
11
10
9
8
7
6
5
4
3
Spruce Gulch
Airplane
Gulch
Right Fork
Stage
Springs
Draw
Left Fork
Black Cabin Point
Cable Gulch
Dry Gulch
Gulch
Galloway
Gulch
Wagonroad
RIDGE
Gulch
Swizer
Yankee
Horse Pasture Canyon
BLUFFS
Middle



0 1/2 1 2 miles

NORTH

ECI

ECOLOGY CONSULTANTS INC.
Fort Collins, Colorado

Figure 38. Aerial raptor survey and owl census route locations for the Rio Blanco Oil Shale Project.

One aerial survey, consisting of fourteen 17.7 km (11 mi) transects, systematically covers Tract C-a and adjacent areas. Each survey commences in the northwest corner of the census area with odd numbered transects flown from north to south and even numbered transects flown in the opposite direction. Each successive pass is flown approximately 1.6 km (1.0 mi) east of the previous transect.

The second aerial survey covers 10 of the major drainages found in the area. The first gulch surveyed is Little Duck Creek. The census begins at the head of the draw and is flown from west to east. The nine draws remaining to the south of Little Duck Creek are flown in alternating east then west directions as the plane shifts south with each successive transect (Figure 38).

Although raptor surveys occur in conjunction with big game aerial surveys, they are initiated separately from the big game census to assure total coverage of the survey area and to allow thermals to develop, which are utilized by raptors for soaring and hunting. At times censuses may be postponed or terminated due to adverse weather (low overcast, high winds, rain, snow, etc.). If a survey is aborted, it is conducted in its entirety as soon as weather conditions become more favorable.

Ground Surveys

Raptors noted during all avifauna field activities are recorded as to species and age class (based on criteria developed by Bent, 1961; Peterson, 1947, 1961; and Brown and Amadon, 1968), and location of observation. While conducting field investigations, all raptor nests encountered are examined and their location plotted on field maps. When active nests are encountered, data on number of eggs, nestlings, age of nestlings (as determined from criteria established by the Western Bird Banding Associations' banding work sheets) and nest location is recorded on the avian nesting record data form (Figure 35). Active nests of each raptor species found breeding in the study area is photographed to document the type of nests used by that species in each habitat utilized.

During late April and early June, 1975 and 1976, potential raptor nesting habitats on Tract C-a and the surrounding area are traversed on the ground for four consecutive days to locate active nests. Surveys are conducted on

transects within three adjacent areas. A representative sample of active raptor nests encountered during each survey will be estimated, contents is recorded, and the location of each nest plotted on field maps (Figure 25).

The first area sampled is Tract C-a. Eight separate transects are walked commencing at the northwest corner of the tract and moving south. Each successive transect begins approximately 0.53 km (0.33 mi) east of the previous one.

Major habitats surrounding Tract C-a comprise the second area sampled. In each of the vegetative types of this area, one 4 km (2.48 mi) transect is walked to locate active nests. The exact locations and number of these transects are determined after an initial field reconnaissance period.

The third area sampled includes the major drainage gulches and other small gulleys where the potential for cliff nesting occurs. Areas where rock outcroppings and steep cliffs occur are determined by ground reconnaissance and by analyzing aerial photographs of the tract and the surrounding area. Also included in this survey are the western slopes of Cathedral Bluffs where the golden eagle, peregrine falcon, and prairie falcon may nest.

Night owl surveys were initiated in December, 1974 and occur during April 1975 and 1976 and December 1975. Surveys are conducted on two nights during each sampling period along a 48.4 km (30 mi) road transect (Figure 38). All surveys commence within 2 hours after sundown. The road transect consists of 30 stops, each permanently marked with stakes and flagging tape, located approximately 1.61 km (1.0 mi) apart. At each stop, an observer leaves the vehicle, walks approximately 15 m (49.2 ft) away from the vehicle and records, by species, the number of owls heard or observed during a 5-minute period on a field data sheet (Figure 39). Criteria for determining owl species by vocalizations are based on the observer's experience, recordings of certain species obtained from other biologists and information presented by Peterson (1947, 1961), Bent (1961), Craighead and Craighead (1969), Thorpe (1961) and Armstrong (1973).

OWL NIGHT COUNT – FIELD DATA SHEET

Project _____ Observer _____

Count Location _____ Time Start _____ Time Finish _____

Date _____ Temp Start _____ Temp Finish _____

Sky Condition _____ Wind Start _____ Wind Finish _____
(Beaufort Scale)

Route Description:

Stop Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total

2.3.147

Figure 39. Owl night count field data sheet for the Rio Blanco Oil Shale Project.

2.3.7.3. RESULTS AND DISCUSSION

Thirteen different vegetation types in 20 separate locations were sampled during October and December, 1974 and during February, 1975 by Emlen strip census (Emlen, 1971). Emlen strip transect locations, representing a variety of different slope aspects and elevations, were selected in each vegetation type and these generally correspond to the small mammal live-trap grids. A total of 37 different avian species was recorded along Emlen strip transects during the three sample periods. Winter Emlen strip surveys were hampered by inclement weather. Only 12 of the 20 transects were completed during December and most of these were surveyed under less than acceptable conditions. All 20 transects were sampled during February.

Qualitative "walk through" surveys to record additional species, including gamebirds, were conducted during the same periods as were Emlen strip censuses. Sixteen additional avian species, including two gamebirds, were recorded during the qualitative surveys.

Waterfowl surveys at Stake Springs Draw impoundment were conducted during October, 1974. Only one waterfowl species, the mallard duck, was observed.

Aerial raptor censuses were conducted once during November and December, 1974 and twice during January and February, 1975. A total of 90 individual birds representing five different raptor species was recorded during these flights.

Night owl censuses were conducted twice during December, 1974 along a 35.5 km (22 mi) road transect. Adverse road conditions did not permit sampling of the entire 48.4 km (30 mi) transect. Four different owl species were seen or heard during the road censuses.

Fifty-seven bird species were tallied during all avian field census activities conducted during the fall-winter period (October, 1974 through February 1975) and these species are listed in Table 23.

The variability of avian census data gathered during fall-winter periods places severe limitations upon the kind of conclusions which may be drawn from them. Therefore, the summary of field data gathered during fall and winter sampling has been interpreted in a brief and very tentative fashion.

Table 23. Species of birds observed during field investigations conducted in October and December, 1974, and February, 1975, for Rio Blanco Oil Shale Project, Tract C-a.

ORDER FAMILY Species	Common Name	Field Code 1/
ANSERIFORMES (Screamers, Swans, Geese & Ducks)		
ANATIDAE (Swans, Geese & Ducks)		
Anas platyrhynchos	Mallard	ANPL
FALCONIFORMES (Vultures, Hawks & Falcons)		
ACCIPITRIDAE (Hawks, Old World Vultures and Harriers)		
Buteo jamaicensis	Red-tailed hawk	BUJA
Buteo lagopus	Rough-legged hawk	BULA
Aquila chrysaetos	Golden eagle	AQCH
Haliaeetus leucocephalus	Bald eagle	HALE
Circus cyaneus	Marsh hawk	CICY
FALCONIDAE (Caracaras and Falcons)		
Falco mexicanus	Prairie falcon	FAME
Falco sparverius	American kestrel	FASP
GALLIFORMES (Megapodes, Curassows, Pheasants and Hoatzins)		
TETRAONIDAE (Grouse and Ptarmigans)		
Dendragapus obscurus	Blue grouse	DEOB
Centrocercus urophasianus	Sage grouse	CEUR
CHARADRIIFORMES (Shorebirds, Gulls, Auks, and Allies)		
CHARADRIIDAE (Plover, Turnstones and Surfbirds)		
Charadrius vociferus	Killdeer	CHVO
STRIGIFORMES (Owls)		
STRIGIDAE (Typical owls)		
Otus asio	Screech owl	OTAS
Bubo virginianus	Great horned owl	BUVI
Glaucidium gnoma	Pygmy owl	GLGN
Asio flammeus	Short-eared owl	ASFL

Table 23. (Continued)

ORDER FAMILY Species	Common Name	Field Code 1/
PICIFORMES (Woodpeckers, Jacamars, Toucans and Barbets)		
PICIDAE (Woodpeckers and Wrynecks)		
Colaptes auratus cafer	Common (red-shafted) flicker	COAC
Dendrocopos pubescens	Downy woodpecker	DEPU
PASSERIFORMES (Perching birds)		
ALAUDIDAE (Larks)		
Eremohpila alpestris	Horned lark	ERAL
CORVIDAE (Jays, Magpies and Crows)		
Cyanocitta stelleri	Steller's jay	CYST
Aphelocoma coerulescens	Scrub jay	APCO
Gymnorhinus cyanocephalus	Pinyon jay	GYCY
Pica pica	Black-billed magpie	PIPI
Corvus corax	Common raven	COCO
Nucifraga columbiana	Clarks' nutcracker	NUCO
PARIDAE (Titmice, Verdins and Bushtits)		
Parus atricapillus	Black-capped chickadee	PAAT
Parus gambeli	Mountain chickadee	PAGA
Parus inornatus	Plain titmouse	PAIN
Psaltriparus minimus	Common bushtit	PSMI
SITTIDAE (Nuthatches)		
Sitta carolinensis	White-breasted nuthatch	SICA
Sitta canadensis	Red-breasted nuthatch	SICN
Sitta pygmaea	Pygmy nuthatch	SIPY
CERTHIIDAE (Creepers)		
Certhia familiaris	Brown creeper	CEFA
TURDIDAE (Thrushes, Solitaires and Bluebirds)		
Turdus migratorius	American robin	TUMI
Sialia currucoides	Mountain bluebird	SICU
Myadestes townsendi	Townsend's solitaire	MYTO

Table 23. (Continued)

ORDER FAMILY Species	Common Name	Field Code 1/
PASSERIFORMES (Continued)		
SYLVIIDAE (Old World Warblers, Gnatcatchers and Kinglets)		
Regulus calendula	Ruby-crowned kinglet	RECA
MOTACILLIDAE (Wagtails and Pipits)		
Anthus spinoletta	Water pipit	ANSP
BOMBYCILLIDAE (Waxwings)		
Bombycilla cedrorum	Cedar waxwing	BOCE
LANIIDAE (Shrikes)		
Lanius excubitor	Northern shrike	LAEX
STURNIDAE (Starlings)		
Sturnus vulgaris	Starling	STVU
PARULIDAE (Wood warbler)		
Dendroica coronata	Yellow-rumped warbler	DECO
PLOCEIDAE (Weaver finches)		
Passer domesticus	House sparrow	PADO
ICTERIDAE (Meadowlarks, Blackbirds and Orioles)		
Sturnella neglecta	Western meadowlark	STNE
Euphagus cyanocephalus	Brewer's blackbird	EUCY
FRINGILLIDAE (Grosbeaks, Finches, Sparrows and Buntings)		
Carpodacus mexicanus	House finch	CAME
Leucosticte atrata	Black rosy finch	LEAT
Leucosticte australis	Brown-capped rosy finch	LEAU
Junco hyemalis hyemalis	Dark-eyed (slate-colored) junco	JUHY
Junco hyemalis oreganus	Dark-eyed (Oregon) junco	JUHO
Junco caniceps	Gray-headed junco	JUCA
Amphispiza belli	Sage sparrow	AMBE
Pizella arborea	Tree sparrow	SPAR

Table 23. (Continued)

ORDER FAMILY Species	Common Name	Field Code [1/]
PASSERIFORMES (Continued)		
FRINGILLIDAE (Continued)		
Zonotrichia leucophrys	White-crowned sparrow	ZOLE
Passerella iliaca	Fox sparrow	PAIL
Melospiza melodia	Song sparrow	MEME
Rhynchophanes mccownii	McCown's longspur	RHMC
Calcarius ornatus	Chestnut-collared longspur	CAOR
Plectrophenax nivalis	Snow bunting	PLNI

[1/] Four letter code, based on the first two letters of the generic and specific or subspecific, used to record species on field data sheets.

2.3.7.3.1. General Avifauna (Emlen Strip Censuses)

Aspen

Two Emlen strip transects were surveyed in a single aspen stand; one during October 1974 and one during February 1975. A total of 20 birds representing six different species was recorded for the aspen type during these surveys (Table 24). The gray-headed junco, mountain chickadee, and black-capped chickadee were observed more often than any other species in the aspen type. These three species are generally considered to be associated with large areas of aspen (Twomey, 1942).

Douglas Fir

Ninety-five birds representing ten different species were recorded along two Emlen strip transects surveyed in a Douglas fir stand (Table 24). One transect was surveyed during October 1974, the other was surveyed in February 1975. The gray-headed junco was the most frequently observed avian species encountered along the Douglas fir transect surveyed in October, but this species was not observed during February sampling. Many more individual birds were counted along the Emlen strip transect surveyed during February. Large numbers of mountain chickadees, black-capped chickadees and red-breasted nuthatches were observed during the February survey but none of these species was encountered in the Douglas fir type during the October survey (Table 24).

Upland Meadow

On the five transects surveyed in the upland meadow vegetation type during October (2 transects), December (1 transect), and February (2 transects), only four different avian species were recorded. All of these were observed during the October survey (Table 24) when they were recorded in low numbers. Harsh windswept conditions usually prevail at Piceance Basin upland meadow sites during the winter months (Ward, Slouson, and Dix, 1974) and these conditions may have contributed to the low avifauna counts recorded during fall and winter surveys.

Mixed Brush

Nine different avian species were recorded along five transects surveyed in the mixed brush vegetation type during October (2 transects), December

Table 13. Numbers of birds observed per 5mile strip transect in thirteen different vegetation types during October and December 1974 and February 1975 on the Rio Blanco Oil Shale Project.

	Aspen			Douglas Fir			Upland Meadow			Mixed Brush			Pinyon-Juniper (North Slope)			Pinyon-Juniper (South Slope)			Pinyon-Juniper Sagebrush			Pinyon-Juniper Mixed Brush			Sagebrush			Greasewood Sagebrush			Rabbitbrush			Riparian			Bottomland Meadow		
	O	D	F[2]	O	D	F	O	D	F	O	D	F	O	D	F	O	D	F	O	D	F	O	D	F	O	D	F	O	D	F	O	D	F	O	D	F	O	D	F
	(1)[1]		(1)	(1)		(1)	(2)	(1)	(2)	(2)	(1)	(2)	(3)	(2)	(3)	(2)	(2)	(2)	(2)	(1)	(1)	(1)		(1)	(2)	(1)	(3)	(2)	(1)	(2)	(1)	(2)	(1)	(1)		(1)	(2)	(1)	
																0.5																		1					

(2 transects), and February (2 transects) sampling periods (Table 24). The gray-headed junco was frequently observed during the October survey but this species was not recorded during the two winter sample periods. Black-billed magpies were frequently observed during December sampling and were frequently observed during February sampling periods. One large flock of snow buntings (32 individuals) was also observed in mixed brush during February. Snow buntings are an uncommon visitor to Colorado's eastern slope and have not previously been recorded for western Colorado (Bailey and Niedrach, 1965; Davis, 1969).

Pinyon-Juniper (North Slope)

Pinyon-juniper north slope sites were surveyed by eight Emlen strip transects during October (3 transects), December (2 transects) and January (3 transects). Only five different avian species were recorded and all of these were observed during the October survey (Table 24). Birds were not encountered in north slope pinyon-juniper stands surveyed in December and February. All species observed during October were present in low numbers with the mountain chickadee and the ruby-crowned kinglet observed more frequently than other avian species.

Pinyon Juniper (South Slope)

Two Emlen strip transects were surveyed during each sampling period (October, December, February) at pinyon-juniper south slope sites. Low numbers of only three avian species were recorded during these surveys (Table 24). The scrub jay was the most frequently observed bird during October and December and no birds were recorded along south slope pinyon-juniper transects during February.

Pinyon-Juniper/Sagebrush

Ten individual birds representing three different species were recorded for pinyon-juniper/sagebrush sites surveyed during fall and winter, 1974 and winter 1975 (Table 24). Sixty percent of all individuals encountered were mountain bluebirds and all of these were observed during October. No birds were encountered during the December survey and only two mountain chickadees were counted during the February sample period in this vegetation type.

Pinyon-Juniper/Mixed Brush

A total of three Emlen strip transects were surveyed at the pinyon-juniper/mixed brush site; one in October, one in December, and one in February. Sampling efforts revealed the presence of only one black-billed magpie and one dark-eyed junco; both were encountered during the October survey (Table 24).

Sagebrush

Only one species (the sage sparrow) was encountered along the five transects surveyed in the sagebrush vegetation type during October (2 transects), December (1 transect), and February (2 transects).

Greasewood/Sagebrush

Five different avian species were recorded along five transects surveyed in the greasewood/sagebrush vegetation type during October (2 transects), December (1 transect), and February (2 transects) sampling periods.

Of the total species observed the song sparrow, white-crowned sparrow (most frequently observed bird in October), yellow-rumped warbler, and the ruby-crowned kinglet were encountered during the October survey. These species were not observed during subsequent surveys. In addition, one scrub jay was observed during the December survey and no birds were encountered along greasewood/sagebrush transects surveyed in February.

Rabbitbrush

Fifty-nine birds representing seven different species were recorded along three Emlen strip transects surveyed in the rabbitbrush vegetation type during October (1 transect), December (1 transect), and February (1 transect) sampling periods (Table 24). The gray-headed junco was the avian species most frequently observed during the October survey while the common bushtit was the most numerous species during February sampling. No birds were encountered along the rabbitbrush Emlen strip transects during December.

Riparian

Two Emlen strip transects were surveyed in a riparian vegetation type; one during October 1974, and one during February 1975. Sixty-one birds

representing nine different species were recorded for the riparian type during these surveys (Table 24).

The October 1974 sample period accounted for 59 out of 61 birds enumerated, and for eight out of nine species observed in this vegetation type the yellow-rumped warbler and the mountain bluebird were observed more frequently than any other avian species during the October survey. Only two killdeer were observed in the riparian vegetation type during the February survey.

Bottomland Meadow

Forty-four birds representing seven different species were recorded along three Emlen strip transects surveyed in the bottomland meadow vegetation type during the October (1 transect), December (1 transect) and February (1 transect) sampling periods (Table 24). Horned larks were frequently observed during the October survey while the black-billed magpie and common raven were most numerous during December and February sampling.

Summary for All Vegetation Types

The largest numbers of individual birds and the greatest number of different avian species were encountered in Douglas fir, mixed brush, rabbitbrush and riparian vegetation types during the fall and winter sampling periods (Table 24). All pinyon-juniper sites (with the exception of the pinyon-juniper north slope), upland meadow and sagebrush vegetation types exhibited a paucity of different avian species as well as low total numbers of birds during October, December and February surveys.

The mountain chickadee was observed in greater numbers than any other avian species during fall and winter surveys. This species also appeared in a greater variety of vegetation types (8 vegetation types total) than any other bird species.

2.3.7.3.2. Upland Gamebirds

Very little information was gathered on gamebirds during the three fall and winter sampling periods. It is premature to speculate on the seasonal abundance of species on the tract from one season's observations, however, some general information is presently available for this portion of the

Piceance Basin. When this information from the literature is combined with initial appraisals of the tract's habitat suitability, a basis for preliminary discussion can be formulated.

Sage grouse - Rogers (1964) describes sage grouse density in the region as "light" and indicates that this grouse has been observed in the eastern slopes of the Cathedral Bluffs and on 84 Mesa. During the fall and winter field periods 24 grouse were observed in sagebrush habitat on the eastern slopes of Cathedral Bluffs.

Blue grouse - Blue grouse habitat, as described by Rogers (1968) appears restricted to points west of the Tract. This coincides with Roger's (1968) reports of a scattered blue grouse population at the higher elevations of the Cathedral Bluffs. Some evidence of blue grouse utilization of habitats directly west of Tract C-a was noted during October and December, 1974 when a total of five birds was recorded.

Mourning doves - Mourning doves had probably left the study area by the time of October censuses. Habitat in the Tract C-a vicinity appears capable of supporting this species. Future sampling efforts should substantiate the presence and ecological distribution of the mourning dove in the study area.

2.3.7.3.3. Waterfowl

Results from the October sampling period indicated that use of the area by waterfowl appeared restricted to the ponds located in Stake Springs Draw. Only one waterfowl species, the mallard, was observed at the Stake Springs Impoundment during October.

2.3.7.3.4. Raptors

Aerial Surveys

Five raptor species were observed during six raptor survey flights conducted over the area of Tract C-a during the fall and winter of 1974 and the winter of 1975. The common raven accounted for over 50% of all raptors enumerated during these surveys. The golden eagle and the rough-legged hawk were also frequently observed during the aerial surveys; each one of these species accounted for over 20% of all raptors enumerated. The bald eagle and

the marsh hawk were observed, but in fewer numbers. Table 25 presents the aerial raptor survey data.

Ground Surveys

Opportunistic ground sightings of raptors in the study area during the fall and winter of 1974 and the winter of 1975 revealed the presence of eight different species, one of which (the prairie falcon) is presently listed as threatened (U.S. Bureau Department of Interior, Bureau of Sport Fisheries and Wildlife, 1973).

The red-tailed hawk was frequently observed during fall and early winter 1974 but was not recorded for the late winter 1975 sample period. The rough-legged hawk was frequently observed during late winter 1975 surveys but not during the fall and early winter 1974 sample periods. Golden eagles and marsh hawks were frequently observed during both fall and winter periods. The common raven was observed more frequently than any other raptor species during both fall and winter sampling. Ravens were seen throughout the Tract C-a area in most vegetation types. The occurrence of mule deer carcasses in the study area may have accounted for the numerous observations of this scavenger. All raptor species opportunistically sighted in the study area during fall and winter are listed in Table 25.

Night transects conducted during December, 1974 revealed the presence of four different owl species (Table 25). Night owl transects provide data on a raptor group that would probably go unnoted during the regular diurnal avian surveys. The data gathered to date are too few to be conclusive, however, they do provide some limited but useful information on the owl species inhabiting the study area and their distribution and abundance.

Figure 40 indicates the distribution of all raptor species observed to date in the study area.

2.3.7.4. SUMMARY AND CONCLUSIONS

The October sampling period probably occurred near the end point of the fall migration for most bird species. Some migrant birds, such as the mountain bluebird, western meadowlark and white-crowned sparrow were still present.

Table 25. Raptor species encountered during aerial surveys, night transects and opportunistic sightings fall and winter, 1974, and winter, 1975, for the Rio Blanco Oil Shale Project, Tract C-a.

Species	Total Number Observed						
	Aerial Surveys				Ground Investigations		
	Nov.	Dec.	Jan.	Feb.	Oct.	Dec.	Feb.
Rough-legged hawk	2	3	7	9	0	9	6
Red-tailed hawk	0	0	0	0	6	2	0
Marsh hawk	1	0	0	0	6	2	0
Golden eagle	5	3	5	5	10	4	8
Bald eagle	0	0	0	2	0	0	0
Prairie falcon	0	0	0	0	0	1	0
American kestrel	0	0	0	0	1	0	0
Screech owl	0	0	0	0	0	1[1/]	0
Great horned owl	0	0	0	0	0	3[1/]	2
Pygmy owl	0	0	0	0	0	1[1/]	0
Short-eared owl	0	0	0	0	0	2[1/]	0
Common raven	4	3	20	21	5	8	47
TOTAL	12	9	32	37	26	31	66

[1/] Observed during night transects on December 16 and 17, 1974.

TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

RAPTORS

ALL INVESTIGATIONS

MORE COMMONLY OBSERVED SPECIES

- golden eagle
- rough-legged hawk
- red-tailed hawk
- marsh hawk
- common raven
- x raptor nest

number by symbol indicates no. of raptors sighted

LESS COMMONLY OBSERVED SPECIES

- BE bald eagle
- PF prairie falcon
- AK american kestrel
- GHO great horned owl
- PO pygmy owl
- SO screech owl
- SEO short-eared owl

represents one sighting

0 1/2 1 2 miles

NORTH

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R. 100 W. R. 99 W.

R. 99 W. R. 98 W.

CATHEDRAL BLUFFS

HORSE RIDGE

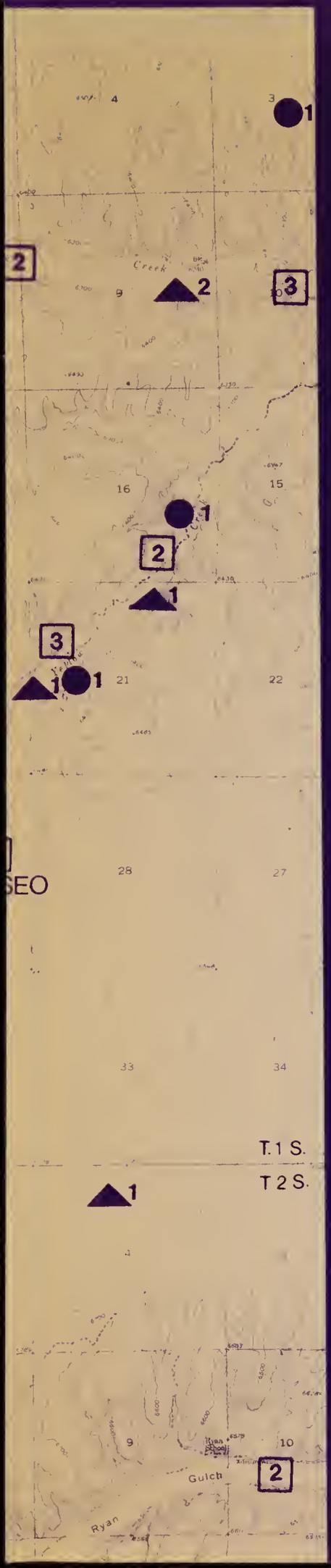
DEAD SAGEBRUSH HILL

BE

GHO

AK

PF



TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

RAPTORS

ALL INVESTIGATIONS

MORE COMMONLY OBSERVED SPECIES

▲ golden eagle

● rough-legged hawk

◒ red-tailed hawk

■ marsh hawk

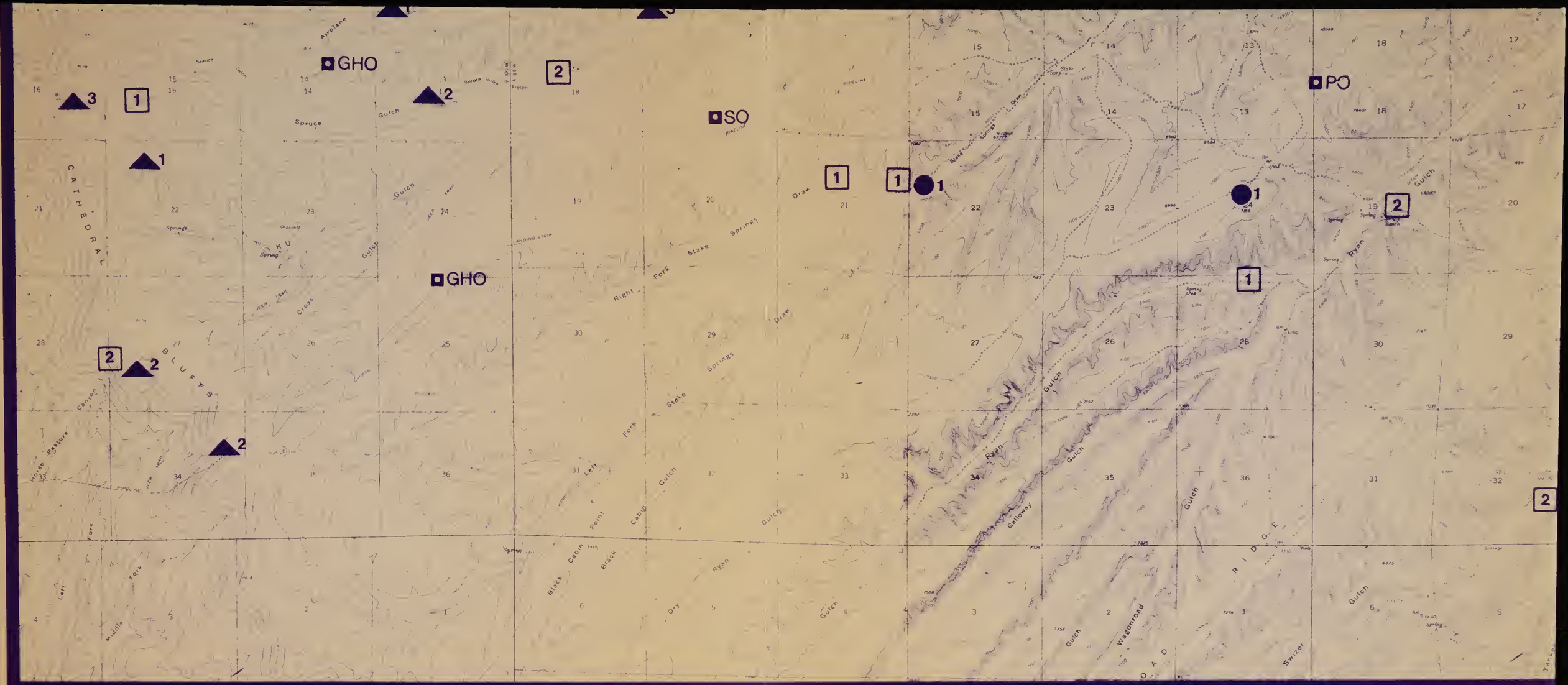
□ common raven

x raptor nest

number by symbol indicates no. of raptors sighted

LESS COMMONLY OBSERVED SPECIES

▣ BE bald eagle


GHO
GHO
SO
PO
CATHEDRAL BLUFFS
Spruce Gulch
Airplane
Right Fork Stake Springs Draw
Left Fork Stake Springs Draw
Ryan Gulch
Galloway Gulch
Black Cabin Point Gulch
Dry Gulch
Wagonroad RIDGE
Swizer Gulch
Middle Fork Left Fork
Horse Pasture Canyon
Cross Gulch
Ryan Gulch
Gulch
Spring
Prospect
Landing Strip
Pipeline



- PF — prairie falcon
- AK — american kestrel
- GHO — great horned owl
- PO — pygmy owl
- SO — screech owl
- SEO — short-eared owl

■ represents one sighting

0 1/2 1 2 miles

NORTH

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Figure 40. Location of raptors observed during all field investigations to date for the Rio Blanco Oil Shale Project.

The December census results exemplified the sparseness of bird distribution typical of temperate regions during late fall. Migratory species encountered in October had departed the area of investigation while more northern migratory species, such as the rough-legged hawk, northern shrike and tree sparrow, had migrated into the region. The horned lark, pinyon jay, black-billed magpie, common raven, mountain chickadee, mountain bluebird, yellow-rumped warbler, gray-headed junco and white-crowned sparrow were the most frequently observed avian species during the fall surveys. These nine species contributed to approximately 75% of the total individual birds observed during fall sampling.

The avian population encountered during February included species which are probably typical of the tract's habitats during winter. The mid-winter avifauna was comprised of 23 species, all of which were observed in low numbers. The horned lark, pinyon jay, mountain chickadee, red-breasted nuthatch and the tree sparrow comprised about 60% of all individuals observed.

Tha fall and winter census data indicate that most avian species encountered in the area of investigation are those expected to be present based on published information from northwestern Colorado and northeastern Utah (Bailey and Niedrach, 1965; Cooke, 1897, 1898, 1900, 1907; Davis, 1969; Hayward, 1967; Hendee, 1929; Rockwell, 1908; Twomey, 1942; Warren, 1908, 1909; and Wooding, 1973).

Several unexpected species were encountered during field sampling. Most of these unexpected species discussed below, with the exception of McCown's longspur and the snow bunting, have been recorded previously in northwestern Colorado, but only as unusual occurrences.

Short-eared owl - Two individuals were encountered during the owl count conducted December 17, 1974. Davis (1969) classified this species as an uncommon winter visitor to open fields. The species was noted by Rockwell (1908) in the winter of 1904-05 in Mesa county. Felger (1910) observed a pair in Moffat county while Hendee (1929) recorded one in Moffat county in April, 1924. Twomey (1942) reported that one short-eared owl was seen at the Ashley Creek marshes, northeastern Utah, in late September, 1937.

McCown's longspur - This species was observed on Cathedral Bluffs in October (one individual) and again in February (two individuals). McCown's longspur is a local breeder in eastern Colorado but was not listed as occurring in western Colorado by either Davis (1969) or Bailey and Niedrach (1965).

Chestnut-collared longspur - A single individual was recorded during the Emlen strip census through the upland meadow transect during October, 1974. Bailey and Niedrach (1965) indicated that this species is a local breeder in Weld County, eastern Colorado. They list one record of the chestnut-collared longspur for western Colorado.

Snow bunting - A flock of 32 snow buntings was observed along the mixed brush Emlen strip transect on Cathedral Bluffs during February, 1975. A search of the literature of avian species recorded from western Colorado, indicated that this sighting is possibly the first record for this species in northwestern Colorado.

Prairie falcon - The only threatened species (Department of the Interior, 1973) encountered on Tract C-a was the prairie falcon. A single bird was observed on December 17, 1974 in the vicinity of 84 Mesa Ranch.

Results of any avian census conducted during the fall must be viewed with a cognizance of certain basic characteristics of bird migration. During migration, many nocturnally migrating species stop each morning to feed and rest in loosely organized flocks. These flocks tend to move along certain topographic features such as drainages. Consequently the species comprising these flocks generally exhibit a much less specific attachment to their favored habitats than they exhibit during the breeding season. Therefore, bird distribution during periods of migration often is highly aggregated, and large areas of seemingly appropriate habitat will contain no birds at a given moment while a relatively small area may contain extremely high densities of birds.

Species composition within a region during migration is usually dynamic. A wave of migrating species can quickly be replaced by another wave of migrants composed of different species. Densities can also vary markedly from day to day during migration. Bird numbers build up in an area when poor weather stalls the advance of the migrants. Bird numbers can also decline

abruptly, when favorable weather conditions promote migration (Curtis, 1969a, 1969b; Hassler, Graber and Bellroge, 1963). The exact path which a flock of birds follows and the location of a stopping point along a migratory route may also be determined by the extent to which the flock is displaced by winds (Graber, 1968). Cold weather generally exerts considerable influence on migrating birds during the fall (Lack, 1960).

The uneven distributional pattern of avian species noted during mid-winter in temperate regions results in large areas of seemingly favorable habitat remaining devoid of birds at particular times, while other areas support a large concentration of birds (Graber and Graber, 1963). The tendency for many species to form flocks during winter influences the degree of interpretation which can be applied to avian density estimates. Birds that do not flock during migration often go unnoticed in avian censuses conducted during the migratory period. Population density and species composition information gathered during the migration period therefore must be viewed with caution (Brewer, 1972).

VI. AVIFAUNA

File Number

A. Emlen Strip Transects
   - Transect 1 - Bottomland Meadow[1/] (9.1.2.1)
   - Transect 2 - Cath Road P-J (9.1.2.2)
   - Transect 3 - Boothill Sage (9.1.2.3)
   - Transect 4 - Cliff P-J (9.1.2.4)
   - Transect 5 - Boxelder Bottom (9.1.2.5)
   - Transect 6 - Gas Line P-J (9.1.2.6)
   - Transect 7 - Rabbitbrush (9.1.2.7)
   - Transect 8 - Remark Sage (9.1.2.8)
   - Transect 9 - Upland Meadow (9.1.2.9)
   - Transect 10 - Tower P-J/Brush (9.1.2.10)
   - Transect 11 - Tract Mtn Brush (9.1.2.11)
   - Transect 12 - Horse P-J/Sage (9.1.2.12)
   - Transect 13 - Ridgetop Meadow (9.1.2.13)
   - Transect 14 - Greasewood Sage (9.1.2.14)
   - Transect 15 - South P-J (9.1.2.15)
   - Transect 16 - Hunting Club P-J (9.1.2.16)
   - Transect 17 - Sage (9.1.2.17)
   - Transect 18 - Mountain Brush (9.1.2.18)
   - Transect 19 - Douglas Fir (9.1.2.19)
   - Transect 20 - Aspen (9.1.2.20)
   - Transect 21 - Riparian (9.1.2.21)

B. Waterfowl (9.3.2)

C. Raptors
   - Ground Surveys (9.4.2.2)
   - Aerial Surveys (9.4.4.1.1)

D. Qualitative (9.5.2)

E. Distribution Records

Transect 1 - Bottomland Meadow (9.1.2.1)

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9.1.2.1-1

FIELD DATA SHEET - EMLEN STRIP CENSUS

1.

Date: 12 OCT Observer: J Kees Site: Meadow Yellow Gulch

Times: 0800-0845 Temp.: 6°C Wind: 0-5 Sky: slight overcast

Project: 83 Other Comments:

Grey - yellowish side patch fine streaks upper breast

F = flock flying over

Species	Number Recorded Per Strip						Age-Sex	Song-Sight	Time
	0-25'	25-50'	50-100'	100-200'	200-400'	400-800'			
Pipit		1					1		
Magpie				1			1		
Marsh H.					1		1		
H. Lark				15			15		
H. Lark					25		2♂	F	

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9.1.21-2

FIELD DATA SHEET - EMLEN STRIP CENSUS

#1

Date: Dec 14, 1974 Observer: VH Site: Yellow Creek bottom

Times: 0910-0945 Temp.: 19°F Wind: 0-5 S Sky: Clear

Project: 83-05 Other Comments: Snow, new 2-3"

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
CICY						1 (♀)	
Pica						11	
BuLA						1	
COCO						111	

7.1.2.1-3

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-16-75 Observer: VH Site: Bottom Land Meadow

Times: 0830-0930 Temp.: 22°F / 31°F Wind: 05 West Sky: clear.

Project: 83 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
BULA						III	
CICY					I		
COCA						IIII	
PIPI					II	IIII	
SPAR					II	I	
AQCH						I	
EKAL						I	II

C.9.1.2.1.

Transect 2 - Cath Road P-J (9.1.2.2)

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9.1.2.2.-1

FIELD DATA SHEET - EMLEN STRIP CENSUS

2

Date: 13 Oct 74 Observer: Van Horn - Rees Site: P-J off site

Times: 1715-1860 Temp.: 20°C Wind: 0-5 Sky: Clear

Project: 83 Other Comments: understory very light.

Species	Number Recorded Per Strip 0-10						Age-Sex	Song-Sight	Time
	0-25'	25-50'	50-100'	100-200'	200-400'	~~400-600'~~			
Mtn. Chick	1 (1)	1 (1)	III (3)						
Plain Tit.	1 (1)	1 (1)							

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9.1.2.2-2

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: Dec 16, 1974 Observer: HH Site: P-J CATH ridge road

Times: 1350-1440 Temp.: 32°F Wind: Ø Sky: 100% o.c.

Project: 83-05 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
(Plain Titmouse		1		11			
MtnChick			1		1		

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9.1.2.2-3

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-19-75 Observer: VH Site: Cat Road P-J

Times: 1625-1735 Temp.: 32°F Wind: 0-5 → E Sky: Clear

Project: 83 Other Comments:

- NOTHING -

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 3 - Boot Hill Sage (9.1.2.3)

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9.1.2.3-1

FIELD DATA SHEET - EMLEN STRIP CENSUS -3

Date: 18 Oct 74 Observer: VanHoen-Reese Site: C-a Sage N of 89 mesa ranch.

Times: 0830 - 0915 Temp. 6°C Wind: ϕ Sky: 15% high overcast

Project: 83 Other Comments: carried during the night & transect runs E to West. bearing 280° Flushed 3 horned larks at 50-100' after transect.

Species	Number Recorded Per Strip ϕ-10						Age-Sex	Song-Sight	Time
	10-25'	25-50'	50-100'	100-200'	200-400'	~~400-800~~'			
Sage Sp.		11							

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9.1.2.3-2

FIELD DATA SHEET - EMLEN STRIP CENSUS

#3

Date: Dec 14, 1974 Observer: VH Site: Boot hill sage

Times: 1050-1120 Temp.: 30°F Wind: 0-5 S Sky: clear

Project: 83-05 Other Comments: Snow 5-6 mm

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
no species observed							

9.1.2.3-3

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-17-75 Observer: VH Site: Boothill Saye

Times: 1045-1130 Temp.: 26°F Wind: 5-10 NE Sky: 100% OC

Project: Other Comments:

-NOTHING-

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 4 - Cliff P-J (9.1.2.4)

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9.1.2.4-1

FIELD DATA SHEET - EMLEN STRIP CENSUS

4

South slope above

Date: 13 Oct 1974 Observer: Van Horn Site: 4 - bottomland.

Times: 1540-1618. Temp.: 20°C Wind: 5-10 Sky: Clear

Project: 83 Other Comments: no avian species observed.

Species	Number Recorded Per Strip						Age-Sex	Song-Sight	Time
	0-25'	25-50'	50-100'	100-200'	200-400'	400-800'			
no species observed during this transect.									

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9.1.2.4-2

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: Dec 15, 1974 Observer: VH Site: #4

Times: 1035-1135 Temp.: 33°F Wind: 0-5 w Sky: 20% overcast

Project: 83-05 Other Comments: _____

_____

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
Scrub			I		II	I	

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9.1.2.4-3

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-21-75 Observer: Van Horn Site: #4 Cliff P-J

Times: 0900-0940 Temp.: 28°F Wind: 0-5 Sky: Clear

Project: 83-05 Other Comments: NO BIRDS OBSERVED

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 5 - Boxelder Bottom (9.1.2.5)

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9.1.25-1

FIELD DATA SHEET - EMLEN STRIP CENSUS

5

Date: 12 OCT 74 Observer: J Rees Site: Rabbitbrush - BOX ELDER GULCH

Times: 1645 - 1730 Temp.: Cool Wind: 0-5 Sky: 20% cover

Project: BB CA Other Comments: _____

Number Recorded Per Strip

Species	10-25'	25-50'	50-100'	100-200'	200-400'	400-800'	Age-Sex	Song-Sight	Time
~~W.C. Sp.~~	////-/// >8	//// >9	/// >9						
W.C. Sp.	///	////	////-	//// ④	/ ①		3 1		
R.C. Kinglet	/								

Ave. 4.5

ECI
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9.1.2.5 -2

FIELD DATA SHEET - EMLEN STRIP CENSUS

#5

Date: 2-21-75 Observer: VanHorn Site: Box elder Bottom

Times: 0800 - 0845 Temp.: 25° Wind: 0-5 Sky: Clear

Project: 83-05 Other Comments: No Species

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 6 - Gas Line P-J (9.1.2.6)

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9.1.2.6-1

FIELD DATA SHEET - EMLEN STRIP CENSUS

6

Date: 12 OCT 79 Observer: Van Horn Site: Upper P-J. Ca

Times: 1640 - 1720 Temp.: 12°C Wind: 0-5 Sky: 50% oc

Project: 83 Other Comments: direction hearing 320°.

Number Recorded Per Strip 0.10

Species	10-25'	25-50'	50-100'	100-200'	200-400'	~~400-800~~ 0'	Age-Sex	Song-Sight	Time
Clarks Nut	1		1				1		
W.B. Nuthat.		1					1		
Plain T. T.		III					2		
R.C. Kinglet		II					2		
Mtn Chick			1				1		
							(7)		

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FIELD DATA SHEET - EMLEN STRIP CENSUS

#6

Date: 2-16-75 Observer: Van Horen Site: Gas Line P-J

Times: 0740 - 0816 Temp.: 30° Wind: 0-5 Sky: Clear - 80%ox.

Project: 83-05 Other Comments: No species observed

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 7 - Rabbitbrush (9.1.2.7)

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9.1.2.7-1

good.

FIELD DATA SHEET - EMLEN STRIP CENSUS

8

Date: 11 OCT 74 Observer: JF Koes Site: Corral-Sage

Times: 0900-0950 Temp.: 12°C Wind: 0-5 Sky: 20% cover

Project: B7 Other Comments: 800 ft

Rain last night but veg. dry, most birds at edge of sagebrush not in middle. Also along creek through

Transect

Species	Number Recorded Per Strip 0-25'	25-50'	50-100'	100-200'	200-400'	~~400-800'~~	Age-Sex	Song-Sight	Time
M Bluebird	11	1111		1			7		
S. H. Junco	11		111	1111+111			13		
R.C. Kinglet	1	1					2		
YR. Warbler	1			1			2		
W.C. Sparrow	11	111	111				8		
							32		

(32)

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9.1.2.7-2

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: Dec 14, 1974 Observer: VH Site: #8

Times: 1530-1610 Temp.: 30° F Wind: 0-5 W Sky: 20% Lite overcast

Project: 83-05 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
No species observed							

7.1.2.1-3 (ECI)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-16-75 Observer: VH Site: RABBITBRUSH

Times: 1010-1050 Temp.: 30°F Wind: 0-5 w/10gust Sky: 80% o.c.

Project: 83 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
PAGA					1	11	
APCO						1	
PSMI						𝍸 𝍸 𝍸 𝍸 𝍸	

E.9.1.2.7.

Transect 8 - Remark Sage (9.1.2.8)

9.1.2.8-1

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-17-75 Observer: VanHorn Site: Remuda Sage #8

Times: 0745- 0830 Temp.: 24°F Wind: 0-5 mph Sky: 95% O.C.

Project: 83-05 Other Comments: No birds observed.

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 9 - Upland Meadow (9.1.2.9)

7.1.2.7-1 (ECI)
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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 12 OCT. 1974 Observer: Van Horn-Rees Site: upland meadow C-a (small stand)

Times: 1145 - 1215 Temp.: 12°C Wind: 5-10 Sky: 75% oc.

Project: 83 Other Comments: Transect bearing 70° cum. WNS by NEE

70° Nor to edge of gulch, then 90° to next ridge

Number Recorded Per Strip Ø-10

Species	10-25'	25-50'	50-100'	100-200'	200-400'	~~400-800~~'	Age-Sex	Song-Sight	Time
cowing f.						-	1	Flyover	
H.Lk.							20+	Flyover	
Clarks Nut					1				

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9.1.2.9-2

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: Dec 17, 1974 Observer: VH Site: #9

Times: 1045-1130 Temp.: 27°F Wind: 0-5 S Sky: Clear

Project: 83-05 Other Comments: w/ gusts to 10 mph

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
	No species observed.						
P. JAY							11

Transect 10 - Tower P-J/Brush (9.1.2.10)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

10(11)

Date: 14 OCT Observer: VonHorn Site: P-J edge Mtn brush

Times: 0825-915 Temp.: 2c (36F) Wind: — Sky: clear

Project: 83 C-a Other Comments: Mtn brush sparse, in shade, frost still present.

Species	Number Recorded Per Strip						Age-Sex	Song-Sight	Time
	0-25'	25-50'	50-100'	100-200'	200-400'	400-800'			
Mt. Junco		1							
Pica				1					

7.1.2.10-2

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-17-75 Observer: VH Site: Mtn shrub/PJ

Times: 1630-1730 Temp.: 26°F Wind: 5-10 NE Sky: Clear

Project: 83 Other Comments:

— NOTHING —

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 11 - Tract Mountain Brush (9.1.2.11)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

11 (12)

Date: 12 Oct 74 Observer: J. Rea Site: Mtn. Brush

Times: 0950 - 1045 Temp.: Cool Wind: 0-5 Sky: 80% Cover

Project: 83 Other Comments: Serviceberry

Species	Number Recorded Per Strip 0-25'	25-50'	50-100'	100-200'	200-400'	400-800'	Age-Sex	Song-Sight	Time
M Clicked			II				2		
GH Junco		II		III			5		

9.1.2.11-2 (ECI)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: Dec 15, 1974 Observer: VH Site: #11

Times: 1430 - 1505 Temp.: 30°F Wind: 0-5 W Sky: 80% o.c. high

Project: 83-05 Other Comments: all birds seen at a farm carcass below transect route. Thus not a true representation of species utilization

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
PICA		1	1	13	2	1	
COCO			2				

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-17-75 Observer: VH Site: Mtn Shrub- Tract

Times: 1425-1530 Temp.: 38°F Wind: 0-5 NW Sky: 20% oc

Project: 83 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
LAEX						1	

Transect 12 - Horse P-J/Sage (9.1.2.12)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

12(13)

Date: 14 OCT 74 Observer: J Rees Site: P.J. - Sage

Times: 0810-0900 Temp.: Cool Wind: 0-5 Sky: clear

Project: 83 Other Comments: Cottontail

Species	Number Recorded Per Strip						Age-Sex	Song-Sight	Time
	0-25'	25-50'	50-100'	100-200'	200-400'	400-800'			
M. Chick.			1						
H. Lark			60	10				F	
M. Bluebird				IIII					
Scrub Jay		1							

8

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: Dec 16, 1974 Observer: VH Site: PJ-Sage Edge

Times: 1300 - 1330 Temp.: 31°F Wind: 0-5 Sky: 100% oc

Project: 83-05 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
MtnChick				11	1		

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9.1.2.12-3

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-19-75 Observer: VH Site: Hoes P-J / SOQE

Times: 1500-1550 Temp.: 29°F Wind: 5-10 → E Sky: Clear

Project: 83 Other Comments:

No species seen

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 13 - Ridgetop Meadow (9.1.2.13)

FIELD DATA SHEET - EMLEN STRIP CENSUS

14(15)

Date: 13 OCT 74 Observer: Van Horn Site: Upland meadow Cathedral Bluffs

Times: 1240-1310 Temp.: 14°C Wind: 0-5 Sky: Clear.

Project: 83 Other Comments: Transect runs on meadow bearing

Number Recorded Per Strip 0-10

Species	0-25'	25-50'	50-100'	100-200'	200-400'	~~400-800'~~	Age-Sex	Song-Sight	Time
CC Longspur		I					1		
ALK.		II	II				4		
WC. Span.	I	I					2		
							7.		
	1330	some					1430		
Gtl. Tmo		IIII	II						
Blue Grouse	I								
R.C.K.			I						
Wtn Chick	II	II	I						
B.C. Chick			I						

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-20-75 Observer: VH Site: Ridgetop Meadow

Times: 1110- 1205 Temp.: 21°F Wind: 5-10 Sky: 80% oc

Project: 83 Other Comments:

No species observed.

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 14 - Greasewood-Sage (9.1.2.14)

FIELD DATA SHEET - EMLEN STRIP CENSUS

15(A)

Date: 12 OCT 74 Observer: Van Horn - [redacted] Site: greasewood, sage. C-a. w. of 84 nr. Rawlins

Times: 0930-1045 Temp.: 15°C Wind: 0 Sky: 0.C

Project: 83 Other Comments: Direction of travel, bearing 230°, NE to SW.

Number Recorded Per Strip 0-10

Species	10-25'	25-50'	50-100'	100-200'	200-400'	~~400-800'~~	Age-Sex	Song-Sight	Time
yellow-rump			IIII	I			5		
Song Sparrow		I					1		
W.C. Spar.			I				1		
Horned Lk.						50+		F	flyover
Meadow Lk.						2		F	flyover
Y-r. Warb.						10±2		F	flyover

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: Dec 15, 1974 Observer: VH Site: #15

Times: 0915-1015 Temp.: 24°F Wind: 0-5 w Sky: clear

Project: 83-05 Other Comments: 2-3" new snow

TOTAL Snow 5-6"

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
Scrub					1		

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-17-75 Observer: TH Site: Greasewood - Sage

Times: 0850-0950 Temp.: 26°F Wind: 0-5 w Sky: 95% oc

Project: 83 Other Comments:

NOTHING observed

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 15 - South P-J (9.1.2.15)

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 13 OCT 74 Observer: J Rees Site: P.T. 16(3) south slope

Times: 1530 - 1630 Temp.: 65°F Wind: 0-5 Sky: Clear

Project: 83 Other Comments: So. Slope - open little cover Plain titmouse obs. off transect

Species	Number Recorded Per Strip 0-25'	25-50'	50-100'	100-200'	200-400'	400-800'	Age-Sex	Song-Sight	Time
S. Eagle						+		F	
RB Jay					/				
?. Chick.			/						

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: Dec 7, 1974 Observer: HH Site: PJ south slope on Tract

Times: 0830-0930 Temp.: 22°F Wind: 0-5 S Sky: Clear

Project: 83-05 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
AQCH						1	

4.1.2.12-3 (ECI)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-16-75 Observer: VH Site: TRACT SOUTH P-J.

Times: 1055-1145 Temp.: 28°F Wind: 0-5 w/10 Sky: 100% oc.

Project: 83 Other Comments:

No species observed

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 16 - Hunting Club P-J (9.1.2.16)

good

FIELD DATA SHEET - EMLEN STRIP CENSUS

17(c) Hunting Club P-J.

Date: 11 OCT 1974 Observer: William Rees Site: C-a

Times: 0910-1000 Temp.: 17° C Wind: 0-5 Sky: 70% oc

Project: 83 Other Comments: Rain early in AM.; numerous cows in area

direction of travel for 350m = 130° (SE); 10° for 100m; 315° for 350m (ROBin II marked) through sage & P-J. * 21 deer skulls found on transect

Number Recorded Per Strip ϕ-10

Species	10-25'	25-50'	50-100'	100-200'	200-400'	~~400-800'~~	Age-Sex	Song-Sight	Time
magpie					1 (1)		1		
WH Chick	1 (1)	II (2)			1 (1)		4		
RC kinglet	1 (1)						1		
							6		

FIELD DATA SHEET - EMLEN STRIP CENSUS

#17

Date: Dec 14, '74 Observer: VA Site: P-J hunting Club

Times: 1415-1500 Temp.: 28°F Wind: 0-5 Sky: clear

Project: 83-05 Other Comments: w/ gusts to 10

gE. was hunting over route

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
AQCH						1	
Scrub			1		11	11	

FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-16-75 Observer: VH Site: Hunting Club P-J

Times: 1710-1755 Temp.: 27°F Wind: 0-5 Sky: 100% OC

Project: 83 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
APCO				1		1	
PAGA		1	𝍸	1	11		
SICA			111	11	𝍸		
PAIN		1	11	1			

C.9.1.2.16.

Transect 17 - Sage (9.1.2.17)

FIELD DATA SHEET - EMLEN STRIP CENSUS

18(D)
Bob Elder.

Date: 12 Oct Observer: VonHorn-Rees Site: Sage near oil rig.

Times: 1400 - 1440 Temp.: 12°C Wind: 0-5 Sky: 80% high o.c.

Project: 83 Other Comments: Transect runs 300° downhill for 350m, 215° for 100m; 130° for 350m back up hill. Start on N. side

Species	Number Recorded Per Strip 0-10 10-25'	25-50'	50-100'	100-200'	200-400'	~~400-800'~~	Age-Sex	Song-Sight	Time
no species were observed. 50+ H.Hks overhead.									

7.1.2.11 ~(ECI)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-16-75 Observer: VH Site: North slope SageE

Times: 1530-1630 Temp.: 29°F Wind: 0-5 W. Sky: 100% OC

Project: 83 Other Comments:

No species observed

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over

Transect 18 - Mountain Brush (9.1.2.18)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

19(E)

Date: 13 OCT 74 Observer: CKK Site: Antw. Branch

Times: 1015 - 1100 Temp.: Cool Wind: 0-5 Sky: clear

Project: 83 Other Comments: OAK Brush - serviceberry - Sage heavy to Med cover density

Species	Number Recorded Per Strip						Age-Sex	Song-Sight	Time
	0-25'	25-50'	50-100'	100-200'	200-400'	400-800'			
Junco			60						
	2/3	GRAY HEADED			1/3 State color + Oregon				

* 2/3 Gray headed - 1/3 slate colored + Oregon

9.1.2.19-2

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-20-75 Observer: VH Site: Mtn Brush E

Times: 1330-1915 Temp.: 21°F Wind: 5-10 Sky: 80% OC

Project: 83 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
PLNI					32		
LEAT				13			
LEAU				7			

Transect 19 - Douglas Fir (9.1.2.19)

9.1.2.19-1 (ECI)
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FIELD DATA SHEET - EMLEN STRIP CENSUS

20 (F)

Date: 13 OCT 1974 Observer: Van Horn Site: Cathedral Bluffs - Douglas Fir ~~Aspen~~

Times: 1000 - 1120 Temp.: 5°C Wind: ~~B-F~~ 0-5 Sky: Clear

Project: 83 - C-a Other Comments: There is a great stand of mtn brush in some open areas. one small stand of aspen (± 150 x 30m) Downy seen there.

Species	Number Recorded Per Strip 10-25'	25-50'	50-100'	100-200'	200-400'	~~400-800'~~ 0-10	Age-Sex	Song-Sight	Time
R. B. K.	1	1	1				3		
GH Junco	III	III	III	III			13		
D E. Junco		II	1				3		
Downy Wood Pec					1		1		
Raven					1		1		

Transect ran on slope. The area is very heavy in mtn brush in more open places. Extremely difficult to get through at times. Jumped 5 elk in area.

Douglas Sq. (E) 11

4.1.2.19-2

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-20-75 Observer: DVH Site: Doug fir

Times: 1450-1553 Temp.: 26°F Wind: 0-5 Sky: 60%OC

Project: 83 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
SICA		𝍸 I	𝍸 III	I	III		
STPY		I	II				
PAGA		II	𝍸 𝍸 I	𝍸 𝍸 𝍸	IIII		
PAAT		II	𝍸	𝍸 II	II		
CYST				I	II		

Transect 20 - Aspen (9.1.2.20)

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FIELD DATA SHEET - EMLEN STRIP CENSUS

13(14)

Date: 13 OCT 1974 Observer: Van Horn - Rees Site: Aspen Transect

Times: 1330-1440 Temp.: 14° C. Wind: 0-5 Sky: Clear

Project: 83 Other Comments: Extremely dense understory over

70% of transect

Species	Number Recorded Per Strip 0-10 0-25'	25-50'	50-100'	100-200'	200-400'	~~400-800~~	Age-Sex	Song-Sight	Time
G-H-Jun.		4	2				6		
Blue Grou.	1						1		
R.C. Kig.			1				1		
Mtn Chick	2	2	1				5		
B.C. Chick			1				1		

14

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-20-75 Observer: VH Site: Aspen

Times: 1610-1700 Temp.: 23°F Wind: 5-10 Sky: 50% OC

Project: 83 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
PAAT			II	II	I		
COCO						I	

Transect 21 - Riparian (9.1.2.21)

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9.1.2.21 - 1

FIELD DATA SHEET - EMLEN STRIP CENSUS

1

Date: 12 OCT 1974 Observer: Van Horn Site: Riparian

Times: 1515-1610 Temp.: 12°C Wind: 0-5 Sky: 60% oc.

Project: Other Comments: Transect in 2 halves. first .25 mi 2nd .25 mi. direction bearing 30°. ||

Species	Number Recorded Per Strip 0-10 10-25'	25-50'	50-100'	100-200'	200-400'	~~400-800'~~	Age-Sex	Song-Sight	Time
W.C. Spar.					III		3		
Mtn Blu		III	IIII	IIII I	IIII		20		
Y. R. war	IIII	III IIII	IIII	IIII II			21		
Pica Pica.		I					1		
Fox Sparrow		I					1		
Mtn Chick.		III					3		
Mallard					I		1		
Song Sp		I					1		
							59		

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FIELD DATA SHEET - EMLEN STRIP CENSUS

Date: 2-19-75 Observer: VH Site: Riparian

Times: 0930- 1050 Temp.: 30°F Wind: 5 →E Sky: 30% OC

Project: 83 Other Comments:

Number Recorded Per Strip

Species	0-10'	10-25'	25-50'	50-100'	100-200'	200-400'	Fly Over
CHVO				2			

VI. AVIFAUNA

B. Waterfowl (9.3.2)

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WATERFOWL COUNT RESULTS

893

Date: 11 OCT 1974 Observer: Van Horn - Rees Pond: Ripparian - Stake G.

Times: 1530 Temp: 15°C Wind: Ø-5 Sky: O.C.

Other Comments:

Species		Observations								
Mallard	No.	IIII								
	Time	1530								

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WATERFOWL COUNT RESULTS

893

Date: 12 OCT 1974 Observer: Van Horn - Rees Pond: Ripp - Stake Gultch

Times: 1310 Temp: 12°C Wind: Ø5 Sky: O.C

Other Comments:

Species		Observations								
Mallard	No.	1								
	Time	1310								
	No.									

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WATERFOWL COUNT RESULTS

893

Date: 14 OCT 1974 Observer: Van Horn Pond: Ripp - Stake Gultch

Times: 0830 Temp: 2°C Wind: Ø Sky: Clear

Other Comments:

Species		Observations								
Mallard	No.	IIII IIII I								
	Time	0830								
	No.									

VI. AVIFAUNA

C. Raptors

Ground Surveys (9.4.2.2)

4.4.2.2-1

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FIELD DATA SHEET - STRIGIFORMES NIGHT COUNT

Project 83-66 Observer VH

Count Location Tract Ea Time Start 1730 Time Finish 2030

Date Dec 16, 1974 Temp Start 20° F Temp Finish 7° F

Sky Condition Clear, 1/8 moon (new) Wind Start 0-5 S Wind Finish 0-5 S
(Beaufort Scale)

Route Description:

see attached map

Stop Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~	~~29~~	~~30~~	Total
GHo	0	0	0	0	0	0	0	0	0	0	0	1	—	—	—	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	1

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9.4.2.2-2

FIELD DATA SHEET - STRIGIFORMES NIGHT COUNT

Project 83 Observer VH

Count Location See map. Time Start 1700 Time Finish 2100

Date Dec 7, 1974 Temp Start 26° F Temp Finish 13°F

Sky Condition snow to clear Wind Start 15-20 mph Wind Finish 0-5mph
(Beaufort Scale)

Route Description:

Stop Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Tota
Short-ear	0	1	0	0	0	0	0	0	0	0	0	—	—	—	—	—	—	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Pygmy	0	0	0	0	0	0	0	0	0	0	0	—	—	—	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Great horned	0	0	0	0	0	0	1	0	0	0	0	—	—	—	—	—	—	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Screech	0	0	0	0	0	0	0	0	0	0	0	—	—	—	—	—	—	0	0	0	0	0	0	0	1	0	0	0	0	0	1

Aerial Survey (9.4.4.1.1)

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AERIAL RAPTOR SURVEY

Project: Rio Blanco Oil Shale-83 Observer: VanHuen - Kling

Date: Nov. 21, 1974 Time Start: 1310 Time Finish: 1515

Sky Condition: 15% overcast Temp. Start: 50°F Temp. Finish: 45°F

Wind Start: Slight 0-5 Wind Finish: Slight 0-5 (Temp. & Wind - Ground)

Route Description: 14 transects running North and South, starting in NE Corner moving to the west with each successive transect

Species	♂	♀	Immature	Location
Raven	ADULT			Sec 16 T. 1S. R. 98 W.
Raven	ADULT			Sec 31 T. 1S. R. 98 W.
Rough legged hawk	ADULT			Sec 24 T. 2S. R. 99 W.
Marsh hawk	X			Sec 31 T. 1S. R. 99 W.
Golden Eagle	ADULT			Sec 34 T. 1S. R. 100 W.
Golden Eagle	ADULTS - 2			Sec 34 T. 2S. R. 100 W.
Raven	ADULT			Sec 27 T. 2S. R. 100 W
Golden Eagle			X	Sec 16 T. 2S. R. 100 W.
Golden Eagle			X	Sec 4 T. 1S. R. 100 W.
Rough-legged hawk	ADULT			Sec 4 T. 1S. R. 100 W.
Raven	ADULT			Sec 4 T 2S. R. 99 W.

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AERIAL RAPTOR SURVEY

Project: Rio Blanco - 83-66 Observer: VanHorn - Kling

Date: December 30, 1974 Time Start: 1330 Time Finish: 1530

Sky Condition: Clear Temp. Start: 10°F Temp. Finish: 10°F

Wind Start: 5-10 fm South Wind Finish: 5-10 fm South (Temp. & Wind - Ground)

Route Description: gulch survey - A - J

Species	♂	♀	Immature	Location
Golden eagle	ADULT			Sec 4, T. 1. S R. 100 W.
Golden eagle	ADULT			Sec 22 T. 1S. R. 100 W.
Golden eagle	ADULT			Sec 8 T. 1 S. R. 98 W.
Raven				Sec 16 T 1S. R. 98 W
Rough-legged hawk	ADULT			Sec 35 T 1. S. R. 99 W.
Raven				Sec 18 T 2 S. R. 99 W.
Raven				Sec 18 T. 2 S. R. 99 W
Rough legged hawk	ADULT			Sec 27 T 2. S. R. 98 W.
Rough legged hawk	ADULT			Sec 27 T. 2 S. R 98 W.

T.7.4.1.1-J (ECI)
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AERIAL RAPTOR SURVEY

Project: 83 - 66 Observer: VanHoven - Kling
Date: 1-14-75 Time Start: 1310 Time Finish: 1510
Sky Condition: Clear Temp. Start: 30° Temp. Finish: 30°
Wind Start: 0-5 W. Wind Finish: 0-5 W (Temp. & Wind - Ground)
Route Description: Transects A-J, gulch routes

Species	Adult		Immature	Location
Raven	1			Sec 28 T.2S. R.100 W.
Golden eagle	1			Sec 4 T.1S. R.100 W.
Golden eagle	1			Sec 4 T.1S. R.100 W.
Raven	2			Sec 7 T.1S. R.98 W.
Raven	1			Sec 29 T.1S. R.98 W.
Rough-legged hawk	1			Sec 30 T.1S, R.98 W.
Raven	7			Sec 11 T.1S. R.99 W.
Rough-legged hawk	1			Sec 21 T.2S. R.99 W.
Raven	2			Sec 32 T.2.S. R.98 W.
Rough-legged hawk	1			Sec 33 T.2S. R.98 W.
Rough-legged hawk	1			Sec 27 T.2S. R.98 W.
Rough-legged hawk	1			Sec 27 T.2S. R.98 W.
Rough-legged hawk	1			Sec 27 T.2S. R.98 W.
Raven	1			Sec 29 T.1S. R.98 W.
Raven	2			Sec 6 T.2.S. R.98 W.
Rough-legged hawk	1			Sec 29. T.1S. R.98 W.
Raven	1			Sec 19 T.2S. R.98 W.

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AERIAL RAPTOR SURVEY

Project: 93 - 04 Observer: Van Horn - Kling

Date: 1-14-74 Time Start: 0900 Time Finish: 1125

Sky Condition: Clear Temp. Start: 29° Temp. Finish: 37°

Wind Start: 0-5 W Wind Finish: 0-5 W (Temp. & Wind - Ground)

Route Description: observation during aerial big game census.

Species	Adult	Immature	Location
Golden eagle		1	Sec 20 T.1S. R.98W.
Rough-legged hawk	1		Sec 35 T.1S. R.99.W.
Raven	1		Sec 19 T.2S. R.98W.
Raven	1		Sec 24 T.2.S. R.99W.
Raven	1		Sec. 15 T. 2S. R. 98W.
Golden eagle	1		Sec 4 T. 2 S. R. 98W.
Golden eagle	1		Sec 2 T. 1 S. R. 99 W.

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AERIAL RAPTOR SURVEY

Project: 84 Observer: Van Horn - Kling

Date: ~~1-1-75~~ 2-1-75 Time Start: 1125 Time Finish: 1520

Sky Condition: Clear Temp. Start: 25°F Temp. Finish: 20°F

Wind Start: 5-10 Wind Finish: 10-15 (Temp. & Wind - Ground)

Route Description: 14 N-S. Transects. flown Segmentally from east to west.

Species	Adult		Immature	Location
Rough legged-hawk	1			T.3. §4 mesa Ranch
Rough legged hawk	1			T. 3. §4 mesa Ranch
Raven	1			T. 3. §4 mesa Ranch
Bald eagle	1			T. 7. start of Transect
Raven	1			T. 8. Stalus springs
Golden Eagle	1			T. 14 Begging of Transect
F. kling.				
Rough Legged hawk	1			T. 1 Start.
Raven	3			T. 3 in Yellow Creek
Raven	1			T. 4. 1/2 mile from N. boundry
Golden Eagle	1			T. 13-14 ontwen around. eagle was on hill.

1.7.7.1.1-6(ECI)

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AERIAL RAPTOR SURVEY

Project: 83-66 Observer: VanHorn / Kling

Date: 2-1-75 Time Start: 1425 Time Finish: 1520

Sky Condition: Clear Temp. Start: 25°F Temp. Finish: 20°

Wind Start: 5-10 Wind Finish: 5-15 (Temp. & Wind - Ground)

Route Description: 14 N-S. transects

Species	♂	♀	Immature	Location
Common Raven (3)	adult			Sec 21 T1S R98W
Rough-legged hawk (1)	adult			Sec 3 T1S R98W
Rough-legged hawk (1)	adult			sec 21 T1S R98W
Common Raven (7)	adult			Sec 29 T1S R98W
Common Raven (1)	adult			Sec 6 T1S R98W
Rough-legged hawk (4)	adult			Sec 29 T1S R98W
Common raven (1)	adult			Sec 12 T1S R99W
Bald eagle (1)	adult			Sec 3 T1S R99W
Common Raven (1)	adult			Sec 34 T1S R99W
Common Raven (1)	adult			Sec 21 T2S R99W
Golden Eagle (1)	adult			Sec 13 T2S R100W
Common raven (1)	adult			Sec 24 T1S R100W
Golden eagle (1)	adult			Sec 27 T2S R100W
Golden eagle (1)	adult			Sec 28 T2S R100W

~~E.9.4.1.~~ 2. C.9.4.4.1.1

VI. AVIFAUNA

D. Qualitative (9.5.2)

QUALITATIVE AVIAN RECORD.

T.S.2-1

Date Oct 1974 Observer Van Horn - Rees - Martin Project Little Hills Station

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Scrub Jay	several around bldgs	4				
House Sparrow						
Red-tailed Hawk	w/vole, on T-pole W of bldgs.	1				

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QUALITATIVE AVIAN RECORD.

Date 11 October 1974 Observer Van Horn - Rees Project 83

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Red-tailed Hawk	84 mesa ranch - on t-pole	1	0810	20% oc	12° C	0-5
Robin	over head on T of Hunting Lodge P-J	2	0915	70% oc	17°	—
W. Meadow Larks	in corral & gulch	7	1010	o.c.	18°	—
Stellar's Jay						
Common Flicker (red-shaft)	upper sage area between Corral & Box Elder gulch	1	1030	o.c.	18°	—
→	—	1	—	—	—	—
White-crowned Sparrow	—	2	—	—	—	—
Brown Creeper	Mad hunter's garbage area, below south of area (above) P-J.	1	1203	—	—	—
Scrub Jay	P-J	1	1205	—	—	—
White Crowned Sparrow	Corral gulch bottom Transect	3	1305	o.c	—	—
Magpie	—	1	1310	—	—	—
Horned larks	Cathedral Bluff - Box Elder Rd.	MAny 500+	1410	rain	18°	—
McCown's long spur	—	1	1456	—	—	—
Golden eagle	yellow creek road	1	1710	o.c.	10°	—
Marsh hawk	—	1	1740	o.c.	6°	—

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7.5.2-2

QUALITATIVE AVIAN RECORD

Date 10 October Observer Van Horn - Rea - Martin Project Little Hills

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Williamson's Sapsucker	at Station	1				
Scrub Jay	———	3				
White crowned Sparrow	———	Common				
Wilson's snipe	at creek - Station	1	~~Flew~~			
Blue Grouse	perched in Spruce tree	1				

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QUALITATIVE AVIAN RECORD

Date 13 OCT 1974 Observer Van Horn - Rea Project 83

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Oregon Junco (Darkeyed)	P-J area of sec 8	10+	0900	clear	0° C	ϕ-5
White-crowned Sparrow	Road to Cathedral bluffs south of Stake Springs	Common	0900-1000	—	ϕ° — 3°	—
Golden eagle Pair	C. Bluffs near sec 16	2	1220	—	13° C	5-10
Golden eagle	over air plane ridge Imm.	1350	1	—	14° C	ϕ-5
Horned Lark	Through grass-meadows & C.B.	500+	1000-1500	—	3° — 14°	ϕ-10
Golden eagle	South slope P-J on front	1	1535		18° F	ϕ-5
Scrub Jay	———	1	~~+550~~	—	———	———
Plain Titmouse	after transect ———	1	1610	—	———	———
W. Meadow Lark	In corral gulch	10+	1655	—	18° —	———
Marsh Hawk	———	1	1700	—	—	—
Raven	84-mesa ranch	2	1703	—	———	———

QUALITATIV[illegible]IAN RECORD

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Date 14 OCT 74 Observer Van Horn - Rees Project 84

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Mountain Bluebird	Sec. 8 T-J off site	20+	0815	clear	2°C	ø
Magpie	"	1	—	—	—	—

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QUALITATIVE AVIAN RECORD

Date 12 OCTOBER 1974 Observer Van Horn - Rees Project 83

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Kestrel	84-mesa ranch	1	0900	20% OC	6°C	ø-5
Red-tailed hawk	" flying up Yeller	1	0903	—	—	—
Red	creek					
Red-tailed hawk	perched on T-pole 84-mesa	1	0915	—	10°C	—
Brewer's blackbird	84-mesa ranch	3	0920	—	—	—
House finch (2 pair ♀♂)	"	4	—	—	—	—
Song Sparrow	Greasewood - Corral gulch	1	1050	OC.	15°C	ø
Horned Larks	numerous in C. gulch. overhead	500+	1050→	—	—	—
Pinyon Jays	overhead	2	1105	—	—	—
Cedar Waxwing	Upland meadow on Tract	9	1210	—	12°	ø-5
Cassins Finch	"	1	1220	—	—	—
Horned Larks	overhead during transect 9 A.M.	20+	1205	—	—	—
Common Bushtits	In corral gutch at former					
	Bottom land transect	25+	1300	—	—	—
Mountain Chickadee	"	2	—	—	—	—
Ruby crowned kinglet	"	5+	—	—	—	—
Oregon Junco (Dark-eyed)	near sage transect in sec 7	10+	1630	—	—	—
Gray-headed Junco	"	20+	—	—	—	—

Y.S.21

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QUALITATIVE AVIAN RECORD.

Date Dec 14, 1974 Observer VH Project 83-05

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Golden Eagle	Perched on n. slope at Cattle guard, near entrance to L. Hills.	1	0730	Clear	26°F	0-5
Rough-legged hawk	84 near Ranch	1	0830	clear	27°F	0-5
Raven	feeding on cattle carcass	3	0830	clear	27°F	0-5
Rough-legged hawk	Flying over road on 84	2	1200			
~~Prairie jay~~	near ridge		1350	Clear	27°F	0-5
Prairie jay	heard near Hunting club	?	1450	Clear	29°F	0-5
Scrub jay	foraging at P-J near					
	hunting club	2	1456	Clear	29°F	0-5

9.5.27

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QUALITATIVE AVIAN RECORD

Date Dec 15, 1974 Observer VH Project 83-05

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Prairie falcon ♀	Pleasant Creek, 1.2 mi so. of L.H. turn off.	1	0810	Clear	23°F	0-5
Roughlegged hawk	Pleasant creek " " "	1	0813	Clear	23°F	0-5
Western Meadowlark	near Square M ranch	1				
Marsh hawk ♀	near Ryan gulch entrance	1				
Western Meadow lark	" " " "	1				
Rough legged hawk	84 mesa Ranch	1	0900			
Ravens	feeding on carcass (cow) at 84 mesa	6	0900			
Pinyon jays	across from transect #15	1	1030		24°F	0-5
Downy woodpecker		1	1030			
Magpie	observed in Corral gulch	3	1310		29°F	
Bald Eagle	1.0 mi so. of Sq. M. Ranch	1	1705	Clear	26°F	0-5
White-crowned Sparrow	sage area near transect #9	3				

QUALITATIVE AVIAN RECORD

5.2-6

Date Dec 16, 1974 Observer VH Project 83-05

Species	Location and Habitat Type	Number	Time	% Sky O.C.	Temperature	Wind
Rough-legged hawk	in L.H. valley.	1	0930	100% oc	28°F	0-5
Red-tailed hawk	same	1				
Prairie Falcon	Picrance Creek, perched on T-pole	1	0938			
Prairie Falcon	same	1	0938			
	Both were 1.2 & 2.1 miles so of L.Hills turn off.					
Rough legged hawks	Picrance Creek to Ryan Gulch	7				
Red tailed hawk	same	2				
Sage Grouse	R100WT25 Sec24 SE¼ SE¼	11	1130	100%	26°F	5-10
Mtn Chickadee	P-J woods near Stake Springs	3				
Ravens	on Farm Corners	2				
BB meadowlark	same	6				
Golden Eagle (imm)	same	1	1630			
Tree Sparrow	84 near Ranch	20+				
horned lark	84 near sage route	8				
Song Sparrow	Ryan school house	2				

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QUALITATIV(E) AVIAN RECORD

5.2-7

Date Dec 17, 1974 Observer VH JC Project 83-05

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Golden Eagle (Adult)	hunting club, hunting area	1	0830	Clear	23°F	0-5
Pinion jays	Corral gulch, near old windmill	60+	1045	Clear	27°F	0-5
Northern Shrike	84 mesa ranch		1200	Clear	27°F	
Clark's Nutcracker		2	1215	Clear	27°F	0-5
Red-breasted Nuthatch		(20)?				
Plain Titmice	at hunting club, in P-J	3				
White Crowned	seen by VH + JC	7				
Black capped Chickadee		2				
Scrub jay		3				
Pinion Jay		3				
Golden eagle (imm)	Idaho spring, at old ranch	1	1230		36°F	
Prairie Falcon	harassing golden eagle	1				
Raven	84 mesa (carcass, cow)	3				
Red-tailed hawk	84 mesa area	1				
Rough legged hawk	same	1	1500	clear		
Magpies	in corral gulch	3	1500	clear		
Golden eagle (imm)	corral gulch	1	1530	SNOW	28°F	
(w/ primary missing)				SNOW		
Pinyon Jays		80+	1530	SNOW		
Golden eagle (adult)	at four carcass	1	1534	SNOW		
Tree Sparrows	at 84 mesa ranch					
Raven	carcass 84 mesa	2				
Rough legged hawk	Sec 4 T25 R18W	1				
Merlin (Pigeon hawk)	Little hills area	1	1530	SNOW		
Red-tailed hawk	harassing golden eagle	1	1230			

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QUALITATIVE AVIAN RECORD

Date 2-16-75 Observer VH Project 83

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Horned Larks ERAL	several hundred M. N. of 84 mesa ranch house	25+	0935	Clear	32°F	0-5
Pinyon jays GYCY	heard in Corral gulch	?	1015	80% oc	31°F	0-10
Common Raven COCO	in Corral gulch, W. of Hunting Club	1	1015			
Common Raven COCO	Dry Fork	1	1203	100%	30°F	0-10
Common Raven COCO	Corral Gulch	2	1420	"	"	"
Northern Shrike LAEX	" "	1	1310	"	27° snowing	"
END DAY						

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QUALITATIVE AVIAN RECORD

Date 2-17-75 Observer VH Project 83

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Black billed magpie	84 mesa Ranch area	13		oc	20°F	
Raven	same	9				
Golen Eagle	same	1				
Rough legged hawk	same	1	1210		30°F	
Rough-legged hawk	Corral gulch	1	1400			
Golden eagle	corral gulch	1	1420			
Scrub jay	same	1	1530	Clear	36°F	
Tree Sparrow	same	2	1530			
— end day. —						

QUALITATIVE AVIAN RECORD

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Date 2-19-76 Observer Van Horn Project 83

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Roughlegged hawk	LHentrance to Ryan Gulch	14	0800-0835	O.C.	25°	0-5
Tree Sparrows	Stake springs	20+				
Clark's Nutcracker	same, near duck pond	1				
Northern Shrike (juv)	Stake springs T-pole	1				
Rough legged hawk	84 mesa	2				
Raven	"	5				
B.B. Magpie	"	1				
Tree Sparrow	"	20+				
Rough-legged hawk	Confluence of Box Elder-(Corral)	1				
Clarks Nutcracker	Stake, only in P-J.	1				
Great horned owl	below eagle nest, south of					
	agueda M ranch.	1	1830			

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QUALITATIVE AVIAN RECORD

Date 2-20-75 Observer VanHorn Project 83

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Rough-legged hawk	LH to Ryan gulch	14	0615-0615	100 oc	25°F	10-15
Golden eagle, pair, adult	Soaring above 84 mesa	2	0645		25°F	10-15
Pinyon jay	Stake springs	25+	0705			
Black-rosy finch	Ryan gulch	3	0645			
Black-billed magpie	84 mesa marsh	3	0655			
Common Raven	84 mesa marsh	5	0655			
Common Raven	Ryan Gulch	11	0657			
Common Raven	Cuth bluffs	2	1100	80% oc	20°F	10-15
Black billed magpie	same "	13	1100			
Horned Lark	meadows on Cuth bluff	20+	1230			
Black billed magpie	"	1	1240			
Golden eagle 1 imm.	"	1	1253			
Common raven	"	1	1325			
Horned Lark	Cuth ridge	20+	1445		25°F	5-10
Mc Cowns Longspurs	Cuth ridge	2	1445			
Golden eagle	Cuth ridge	1	1600			
Black-capped chickadee	Aspen area, Cuth ridge	3	1603			
WILD						
Rough-legged hawk	LH to Ryan gulch	1320	1805	50%	25°F	5-10

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QUALITATIVE AVIAN RECORD

Date 2-21-75 Observer Van Horn Project 83

Species	Location and Habitat Type	Number	Time	Sky	Temperature	Wind
Raven, common	Ryan gulch, school house	2	0750	Clear	25°F	0-5
Tree sparrow	Ryan gulch " "	25+	0750			
Common Raven	8 mile creek	6				
Northern Shrike	"	1				
Rough-legged hawk	"	1				
Golden eagle (imm.)	Dutch creek	1	1000		30°F	0-5
Pinyon Jay	same	20+				
Golden eagle (pair)	same	2	1100		32°F	0-5
Black billed magpie	same	6	1125			
Common raven	same	3	1125			

Avifauna (14.1.4)

E. Distribution Records

17167 1

FIELD OBSERVATIONS



Species Common Raven Date 10/10/74 Time —

Means of Identification obs

Number Observed 4 ♂ ____ ♀ ____

Adult ✓ Juv. ____

Habitat Pinon - Juniper

Other Information* ____

Observer SLE, EK

* Include any distinguishing field marks for horses.

14.1.4 - L

FIELD OBSERVATIONS



Species McCown's Longspur Date 10/11/74 Time —

Means of Identification obs

Number Observed 1 ♂ ♀ X

Adult Juv.

Habitat

Other Information* seen near several large flocks (100+) of Horned Larks (Mount would not associate w/ them, stayed seperate, fed in small runs

Observer VanHorn, Ray

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

14.1.4-3



Species Raven Date 12/7/74 Time 9:30 AM

Means of Identification observation

Number Observed ± 15 ♂ _____ ♀ _____

Adult ✓ Juv. _____

Habitat Bottomland meadow / hillside edge

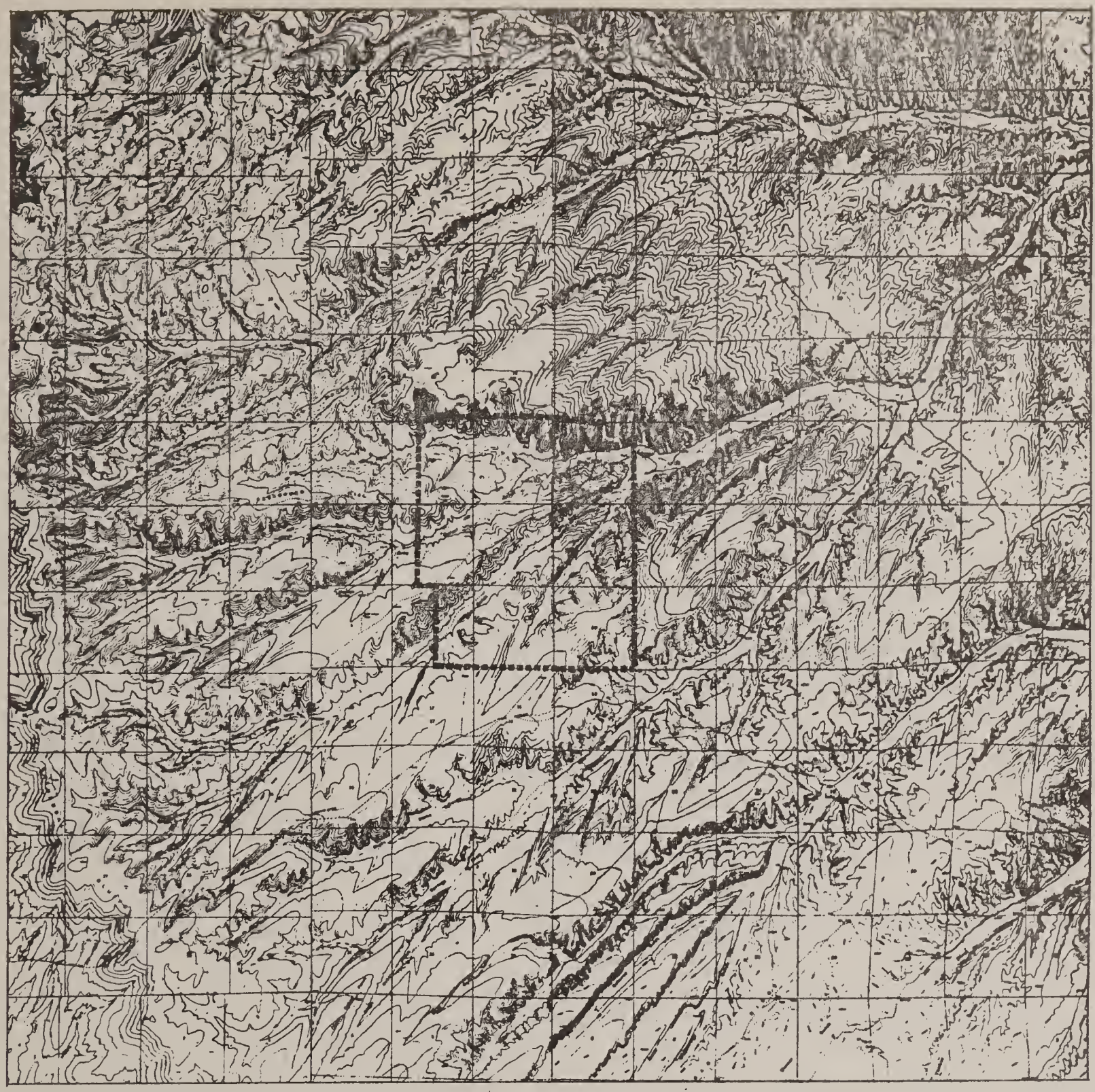
Other Information* _____

Observer J.C. & R.M.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

1a



Species Sage Grouse Date 10/10/74 Time —

Means of Identification obs

Number Observed 1 ♂ _____ ♀ _____

Adult ✓ Juv. _____

Habitat Aspen stand

Other Information* _____

Observer SLE, EK

* Include any distinguishing field marks for horses.



Species Sage Grouse Date 10/10/74 Time —

Means of Identification obs

Number Observed 5 ♂ _____ ♀ _____

Adult X Juv. _____

Habitat mixed sage sagebrush

Other Information* _____

Observer SLE, EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

1c, 1d



Species Sage Grouse Date 10/13/74 Time —

Means of Identification obs

Number Observed 2 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat —

Other Information* _____

Observer Ellis, Ellenwood

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

2a



Species Sage grouse Date Nov 74 Time 4:30 pm

Means of Identification observation

Number Observed 2 ♂ ✓ ♀ ✓

Adult ✓ Juv.

Habitat low sage

Other Information*

Observer Turner, Sandy

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3a



Species sage grouse Date Dec 7, 1974 Time 12:30

Means of Identification tracks

Number Observed 2 ♂ _____ ♀ _____

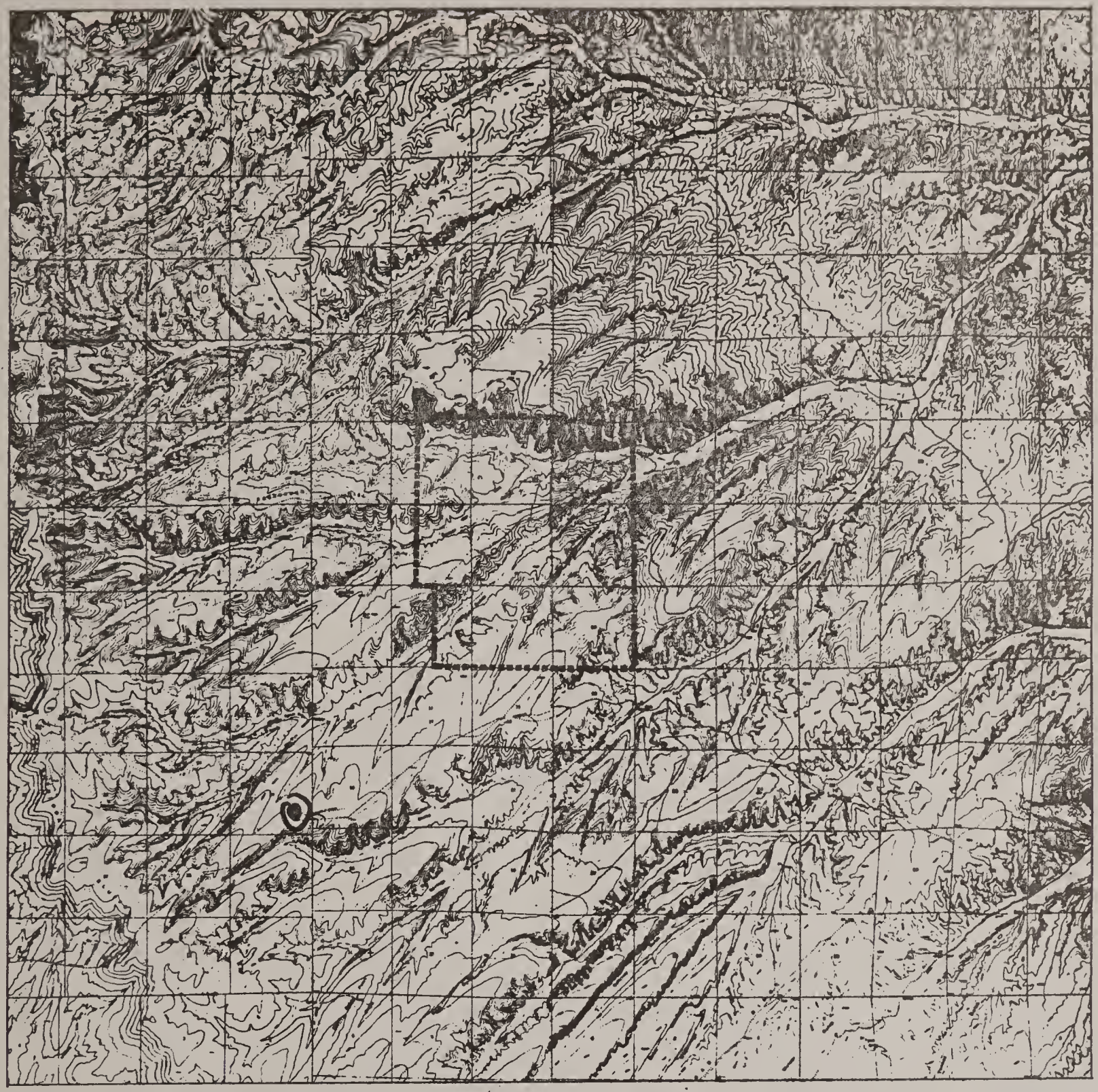
Adult ✓ Juv. _____

Habitat P.J. sage - near hunt camp P.J. grad

Other Information* _____

Observer Sam

* Include any distinguishing field marks for horses.



Species Sage Grouse Date Dec 16, 1974 Time 1130

Means of Identification Visual

Number Observed 11 ♂ 2 ♀ 0

Adult _____ Juv. _____

Habitat Sage

Other Information* flushed from side of road, snow 12" deep.

Observer VH JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3 C



Species Sage Grouse Date 2/9/75 Time 12:00

Means of Identification sight & capture

Number Observed 1 ♂ 1 ♀ _____

Adult 1 Juv. _____

Habitat P-J

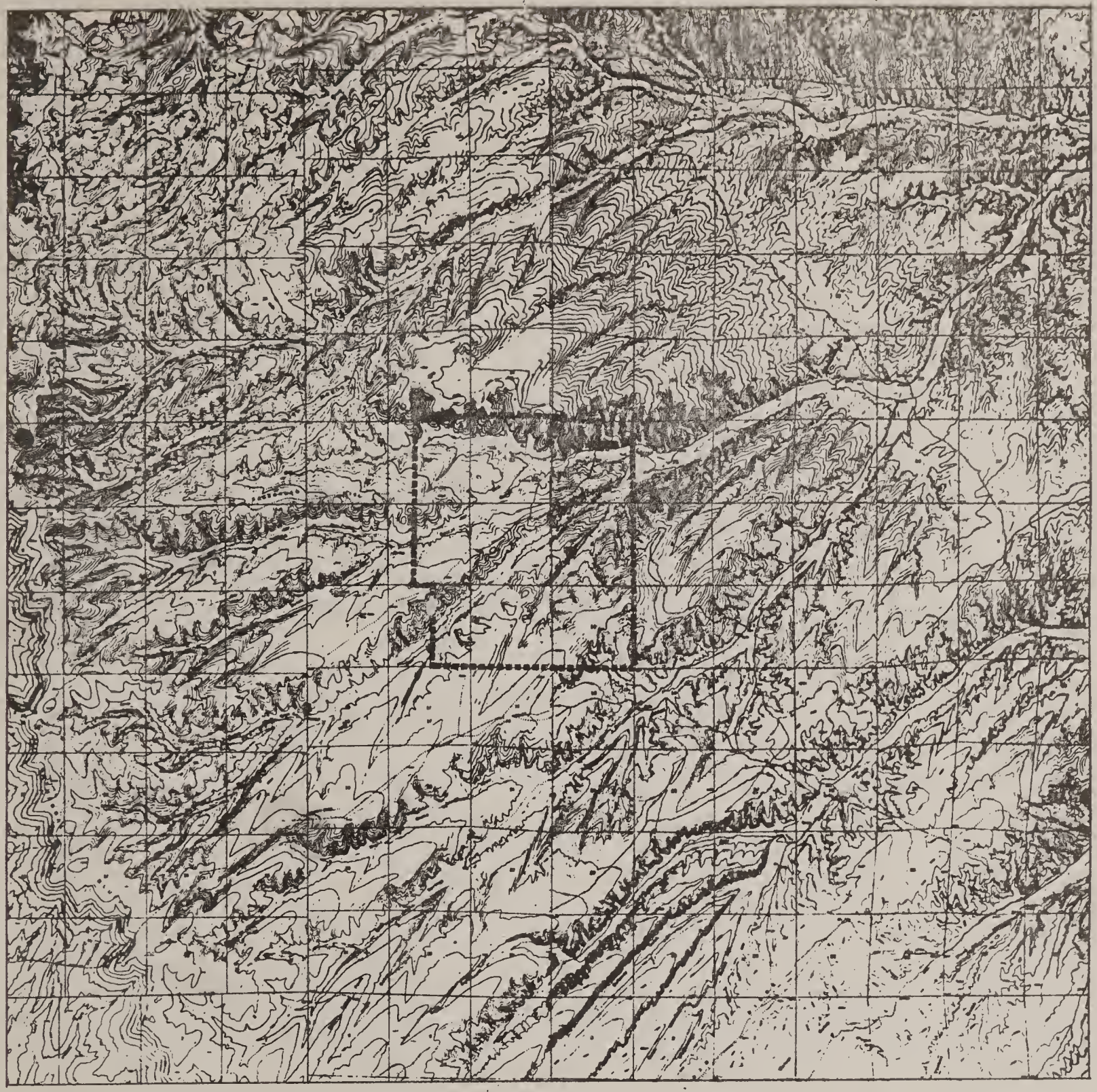
Other Information* wounded wouldn't fly

Observer Gary Baker

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

1a



Species blue grouse Date 10/11/74 Time —

Means of Identification obs

Number Observed 1 ♂ _____ ♀ _____

Adult Y Juv. _____

Habitat _____

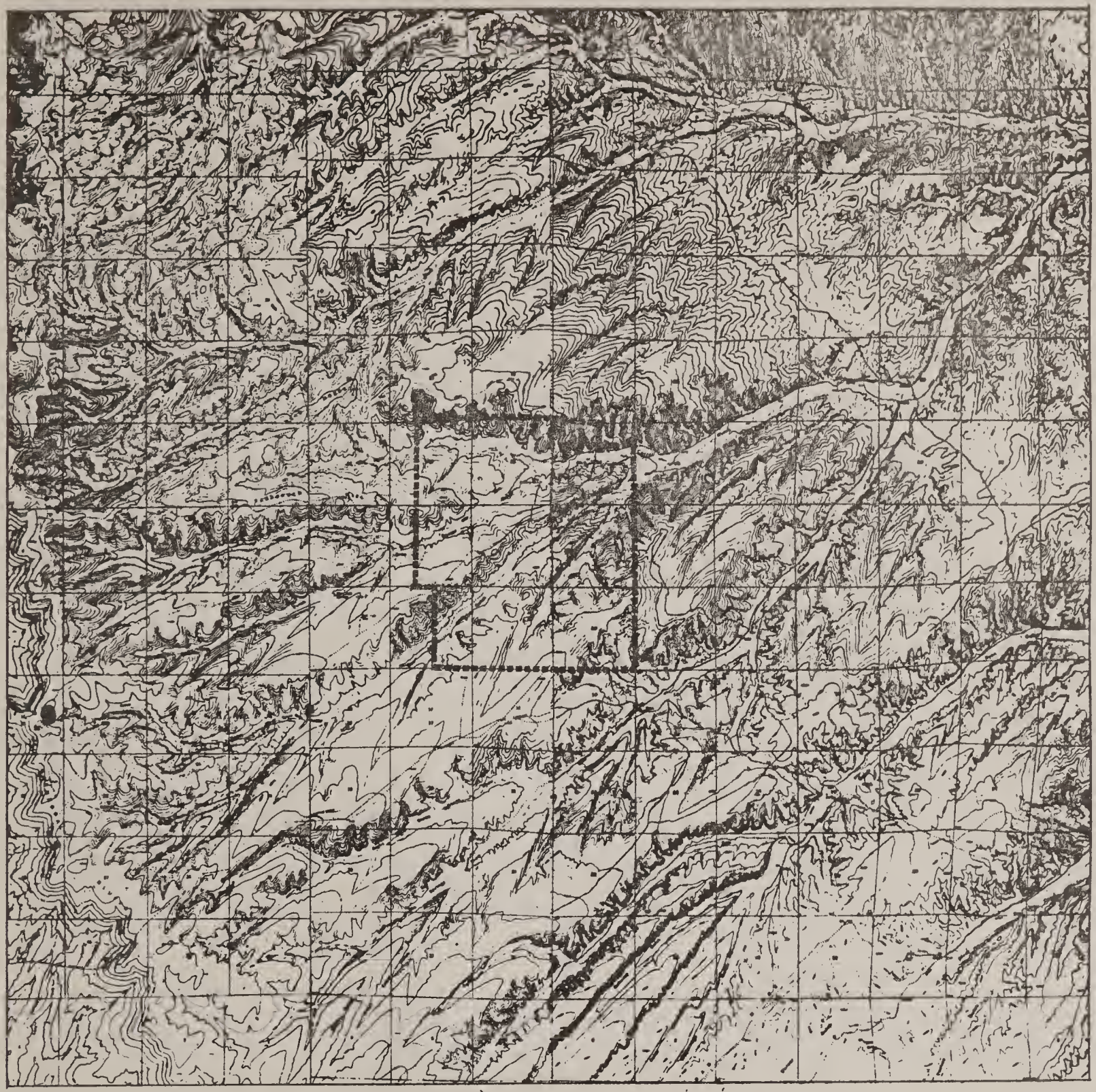
Other Information* _____

Observer SLE, EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

15



Species Blue Grouse Date 10/16/74 Time —

Means of Identification obs

Number Observed 2 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat _____

Other Information* _____

_____

Observer JC EK

* Include any distinguishing field marks for horses.



Species Blue grouse Date 12/7/74 Time 3:19 PM

Means of Identification observation

Number Observed 2 ♂ ____ ♀ ____

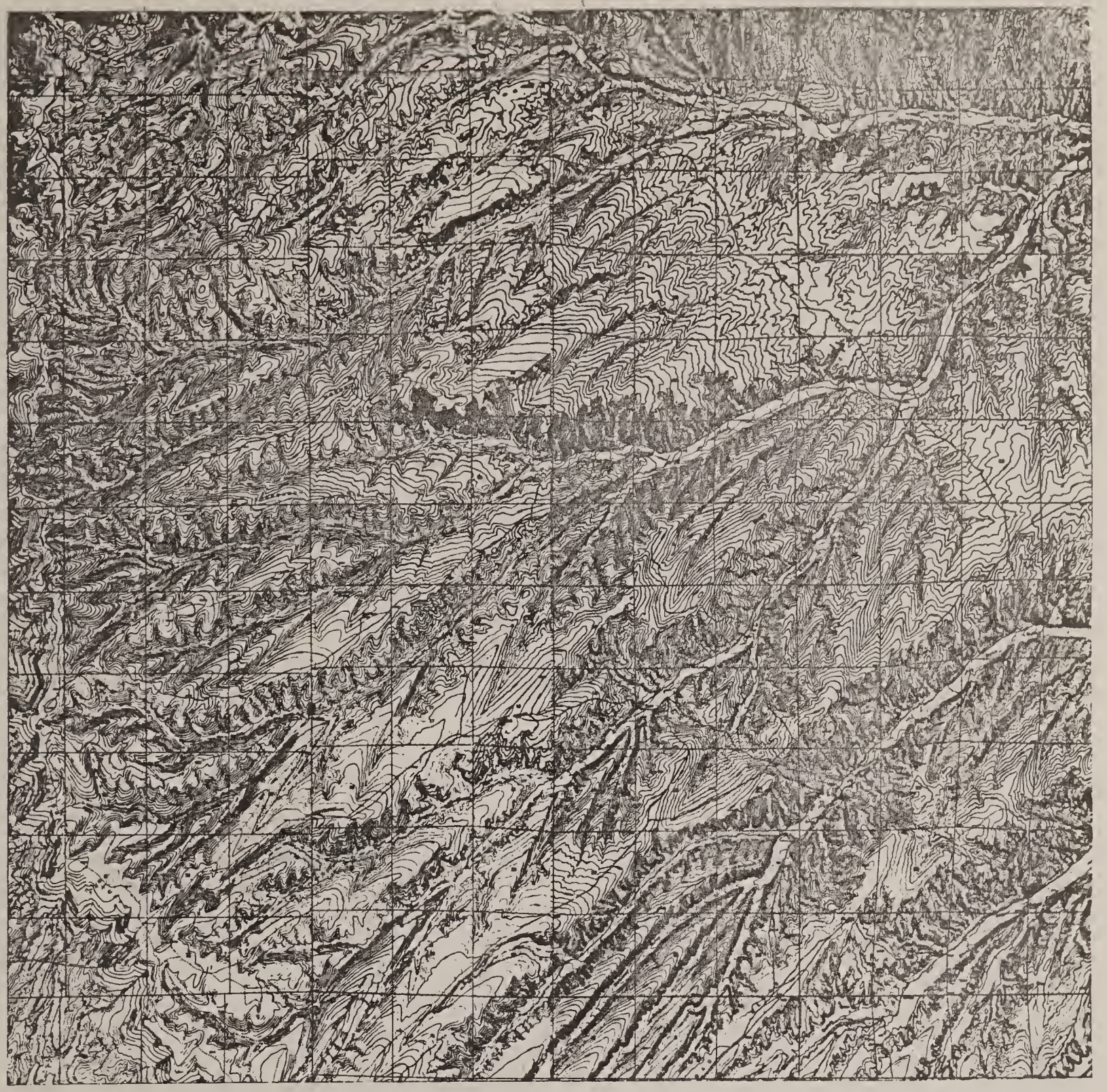
Adult 2 Juv. ____

Habitat Sage - mixed brush

Other Information* ____

Observer Baker / Turner

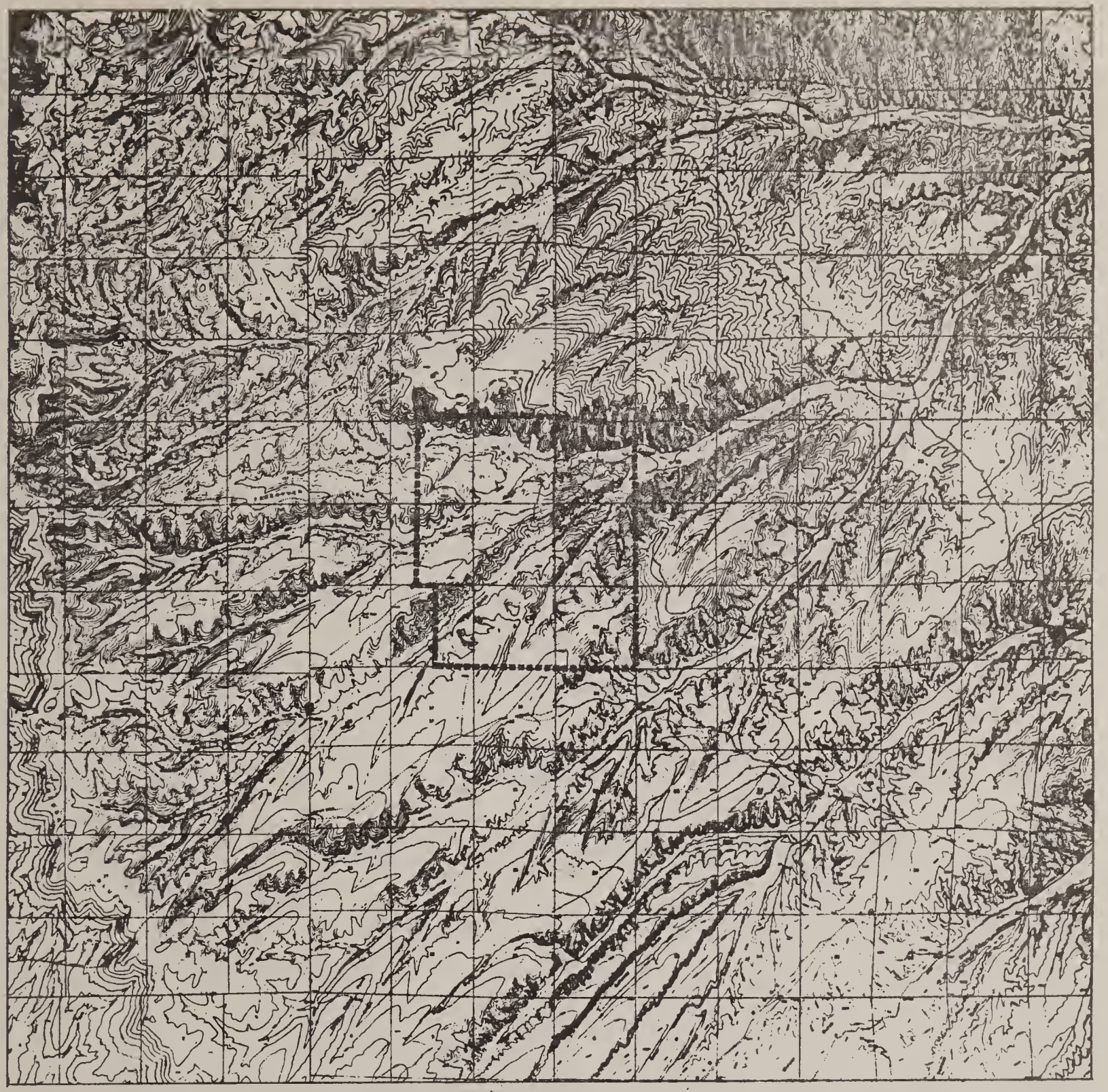
* Include any distinguishing field marks for horses.



X raptor nest in dead juniper
~ 15' above ground
rabbit bones, pieces under tree, ~ 2/
fairly fresh rabbit legs (skin, tendons attached).

10/12/74
SLE + SE

FIELD OBSERVATIONS



Species Common Raven Date 2-20-75 Time 0750

Means of Identification Visual

Number Observed 2 ♂ _____ ♀ _____

Adult ~~ Juv. _____

Habitat Sagebrush

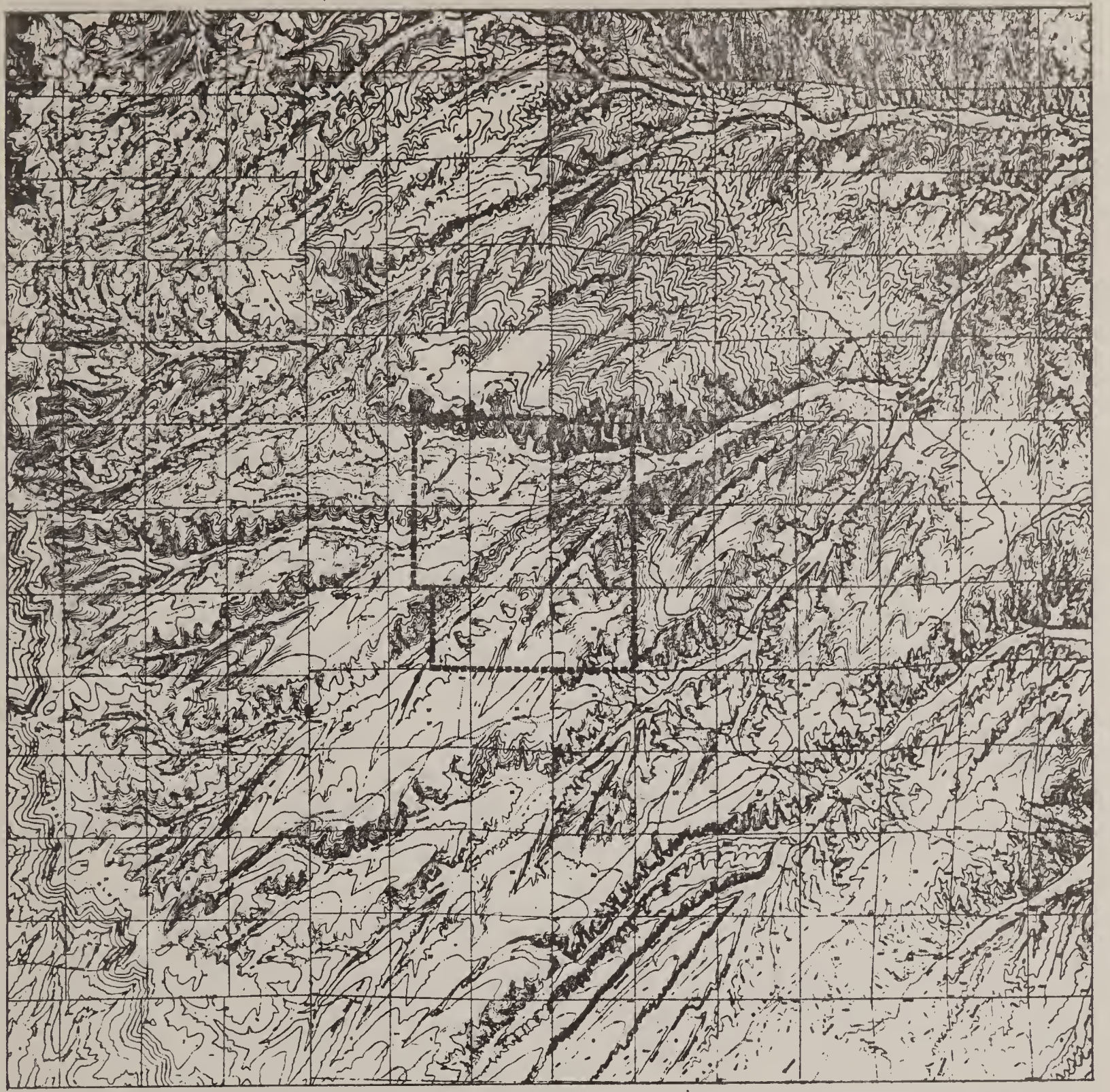
Other Information* South of Rogers gulch school house

Observer _____

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

b



Species Common Raven Date 2-20-75 Time 0655

Means of Identification Visual

Number Observed 5 ♂ ____ ♀ ____

Adult ~~~~ Juv. ____

Habitat 84 mesa ranch

Other Information* ____

Observer D.V.H.

*/ Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

C



Species Common Raven Date 2-20-15 Time 1100

Means of Identification Visual

Number Observed 2 ♂ ♀

Adult ✓✓ Juv.

Habitat Ridge top meadows & Cuth Bluffs.

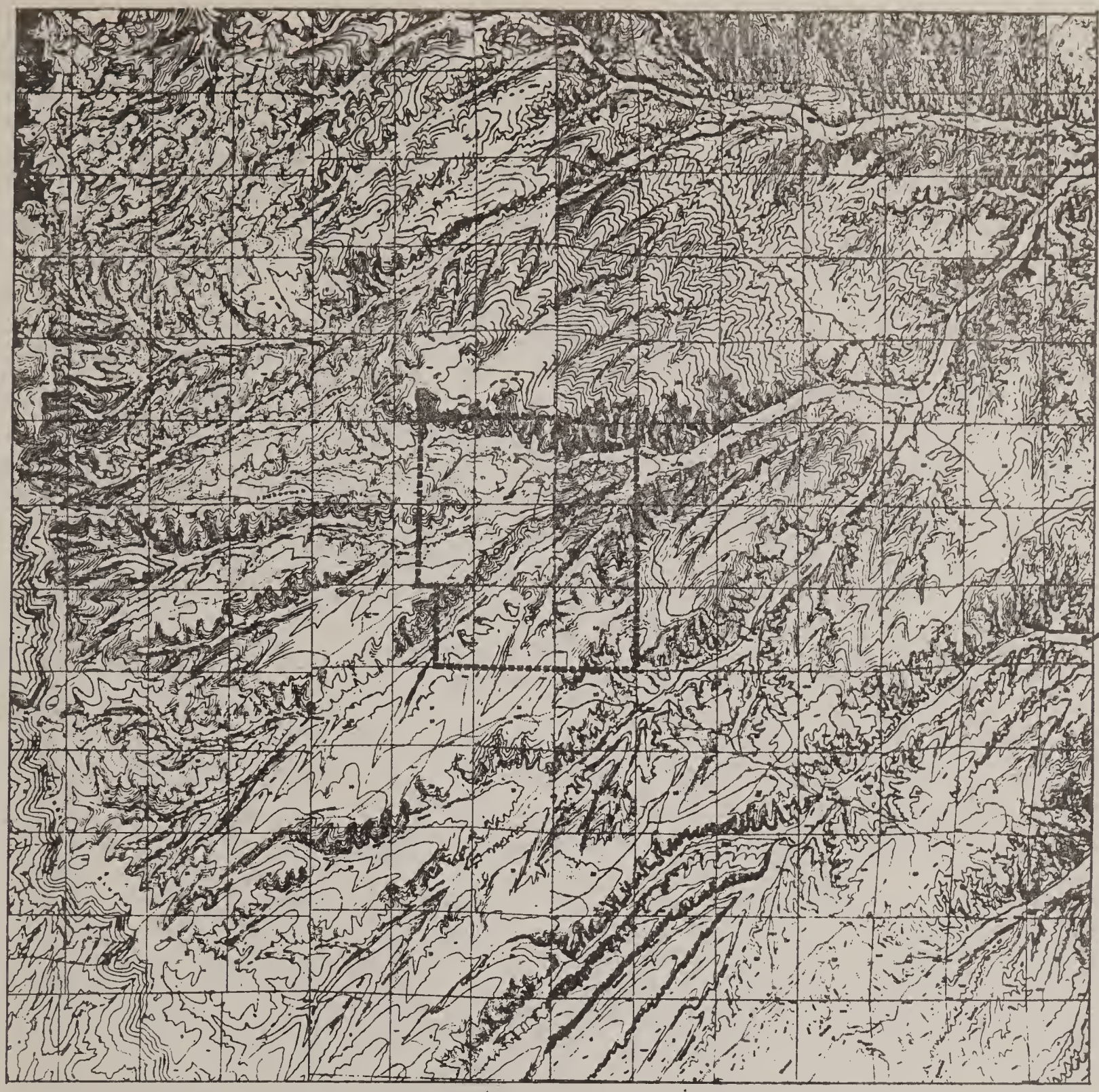
Other Information* at a deer carcass! (doe-fawn)

Observer VH

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

d



Species Common Raven Date 2-20-75 Time 0657

Means of Identification Visual

Number Observed 11 ♂ _____ ♀ _____

Adult ✓ Juv. _____

Habitat Sagebrush bottom

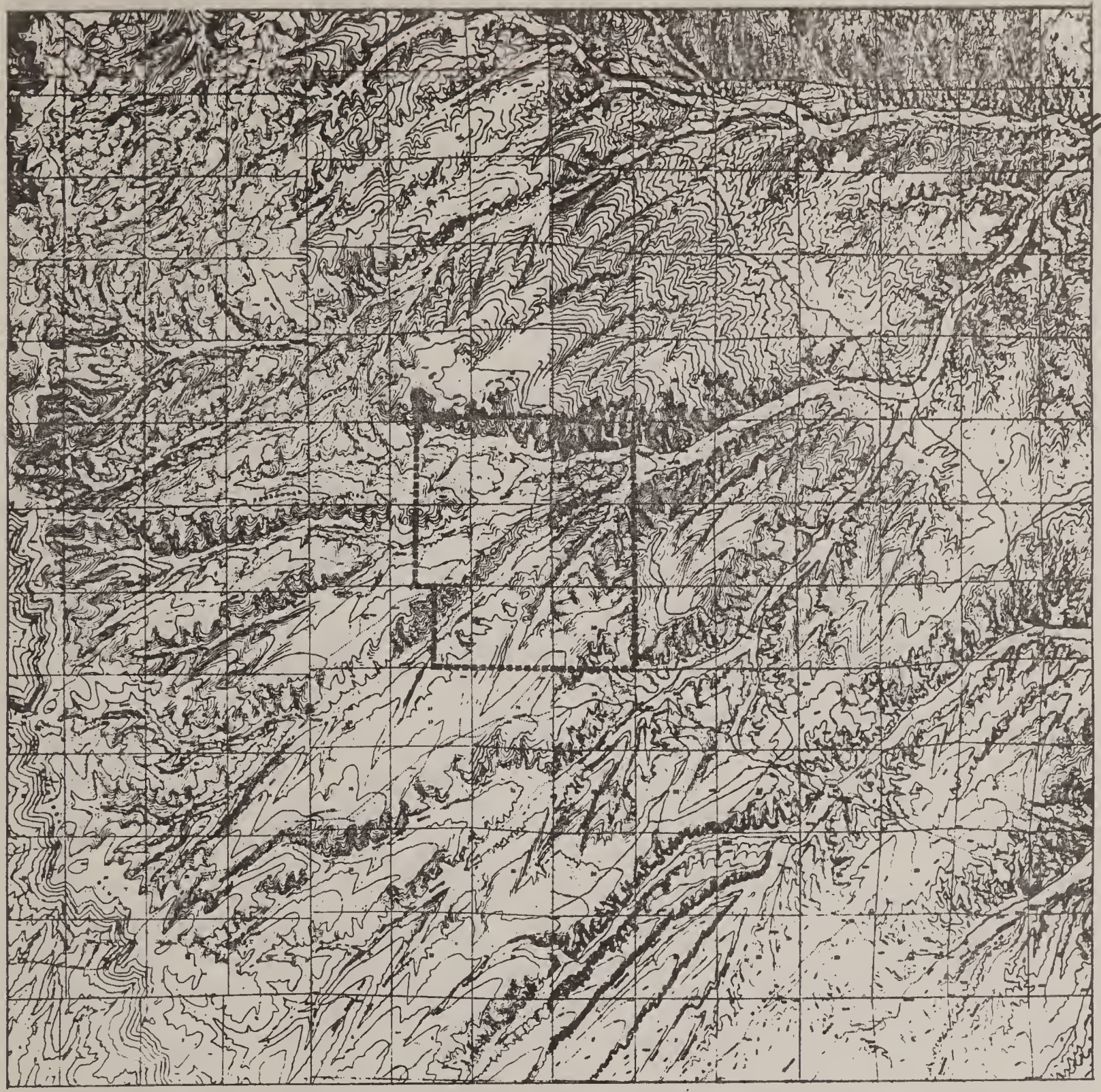
Other Information* all flying in one group

Observer D.R.H.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

e



Species Common Raven Date 2-21-75 Time 1125

Means of Identification _____

Number Observed 3 ♂ _____ ♀ _____

Adult - - - Juv. _____

Habitat Surge

Other Information* feeding on deer carcass

Observer D.V.H.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

1a



Species Marsh Hawk Date 10/18/74 Time 1600

Means of Identification obs

Number Observed 1 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat upland meadow

Other Information* _____

Observer BAKER

* Include any distinguishing field marks for horses.



Species Marsh Hawk Date 10/10/74 Time —

Means of Identification obs

Number Observed 2 ♂ ♀ 2

Adult Juv.

Habitat Sage, meadow, rabbitbrush bottomlands

Other Information*

Observer J G Martin

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

5 a



Species Marsh Hawk Date 2/11/75 Time 1000

Means of Identification direct obs.

Number Observed 1 ♂ ____ ? ♀ ____

Adult ____ Juv. ____

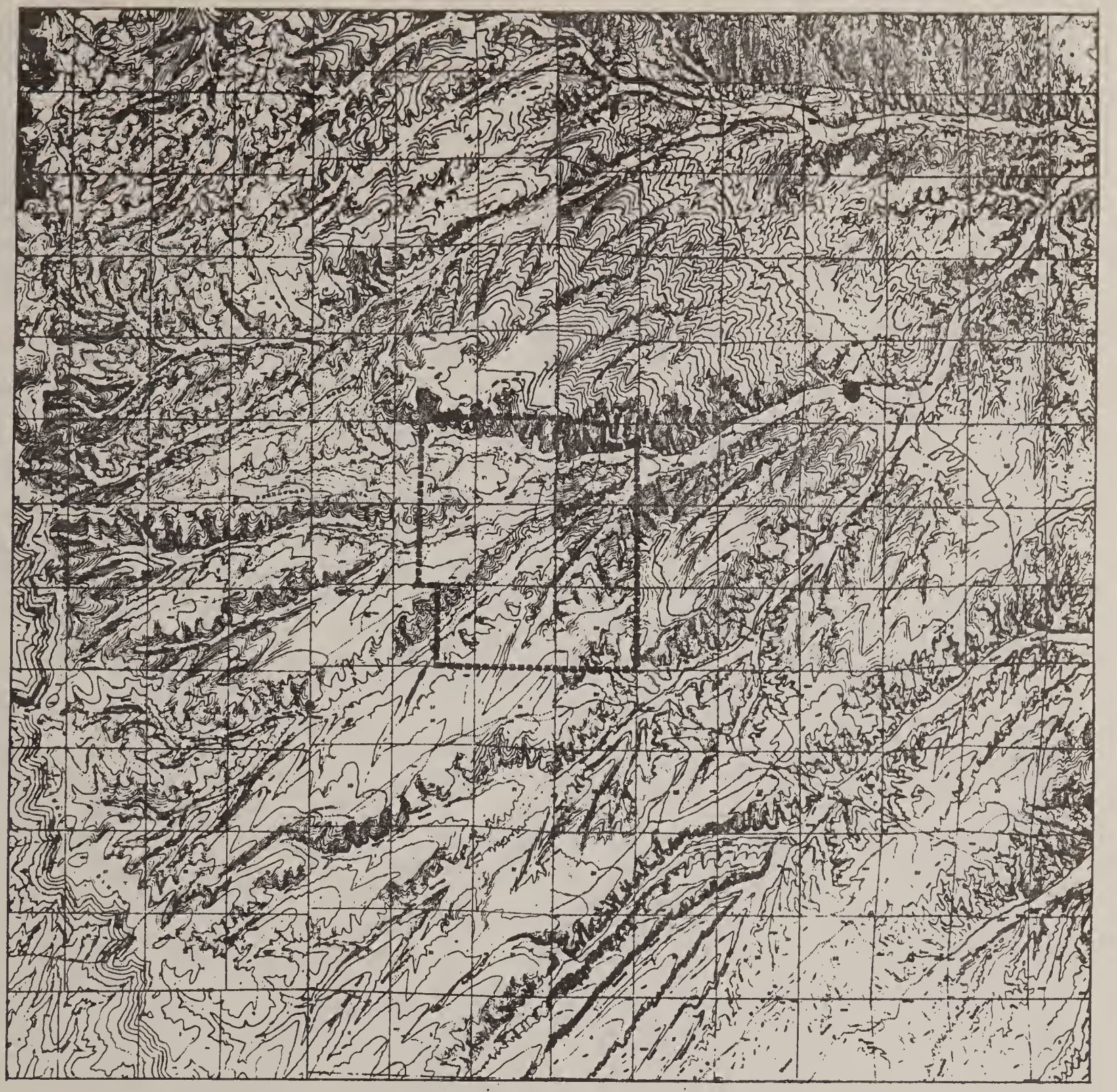
Habitat open sage

Other Information* ____

Observer Jame, Baker

* Include any distinguishing field marks for horses.

5b



Species Marsh Hawk Date 2/12 Time 3:00

Means of Identification _____

Number Observed 1 ♂ X ♀ _____

Adult _____ Juv. _____

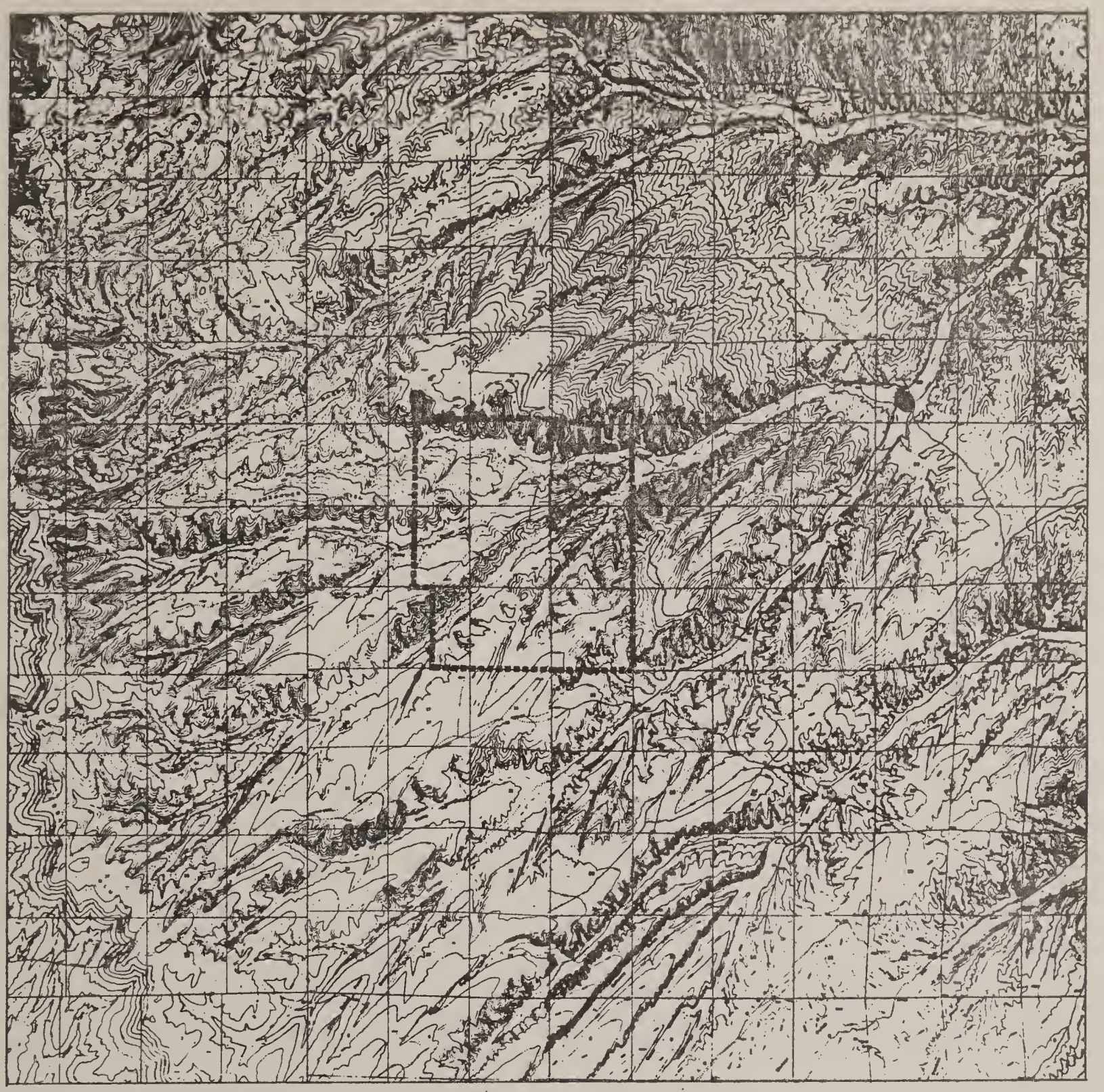
Habitat Bottomland greasewood/Sage

Other Information* _____

Observer Canestoi

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS



Species Marsh Hawk Date 2/16 Time 830

Means of Identification _____

Number Observed 1 ♂ X ♀ _____

Adult X Juv. _____

Habitat Bottomland Meadow

Other Information* _____

Observer Cancelosi

* Include any distinguishing field marks for horses.

5a



Species Great Horned Owl. Date 2/10/75 Time 2300

Means of Identification heard

Number Observed 1 ♂ ? ♀

Adult Juv.

Habitat Pinyon - Juniper

Other Information*

Observer Baker, Sanz

* Include any distinguishing field marks for horses.

5b.



Species Great Horned Owl Date 2/10/75 Time 0200

Means of Identification direct obs.

Number Observed 1 ♂ ____ ? ♀ ____

Adult ____ Juv. ____

Habitat grass-sagebrush - sage

Other Information* ____

Observer Baker, Sam

* Include any distinguishing field marks for horses.

3a



Species Rough legged hawk Date 12/7/74 Time 1:45 PM.

Means of Identification observation

Number Observed 1 ♂ ____ ♀ ____

Adult ✓ Juv. ____

Habitat Pinon - juniper - mtn. brush (Tower Pt Ranch)

Other Information* ____

Observer J. C. + R M.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3:b



Species Rough - legged Hawk Date 12/9/74 Time 3:30pm

Means of Identification observation

Number Observed 1 ♂/ ♀

Adult ✓ Juv.

Habitat Bottomland meadow

Other Information*

Observer JC/RM.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3C



Species Rough-legged hawk Date Dec 14, 1974 Time 0830

Means of Identification Visual

Number Observed 1 ♂ _____ ♀ _____

Adult ✓ Juv. _____

Habitat 84 mi. roads, perched on T-pole

Other Information* _____

Observer VH

* Include any distinguishing field marks for horses.



Species Rough-legged hawk Date Dec 14, 1974 Time 1200

Means of Identification Visual

Number Observed 2 ♂ _____ ♀ _____

Adult ✓ Juv. _____

Habitat Sage

Other Information* Flying over area at about 300 m elevation

Observer VH

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3e



Species Rough-legged hawk Date Dec 15, 1974 Time 0900

Means of Identification visual

Number Observed 1 ♂ _____ ♀ _____

Adult _____ Juv. _____

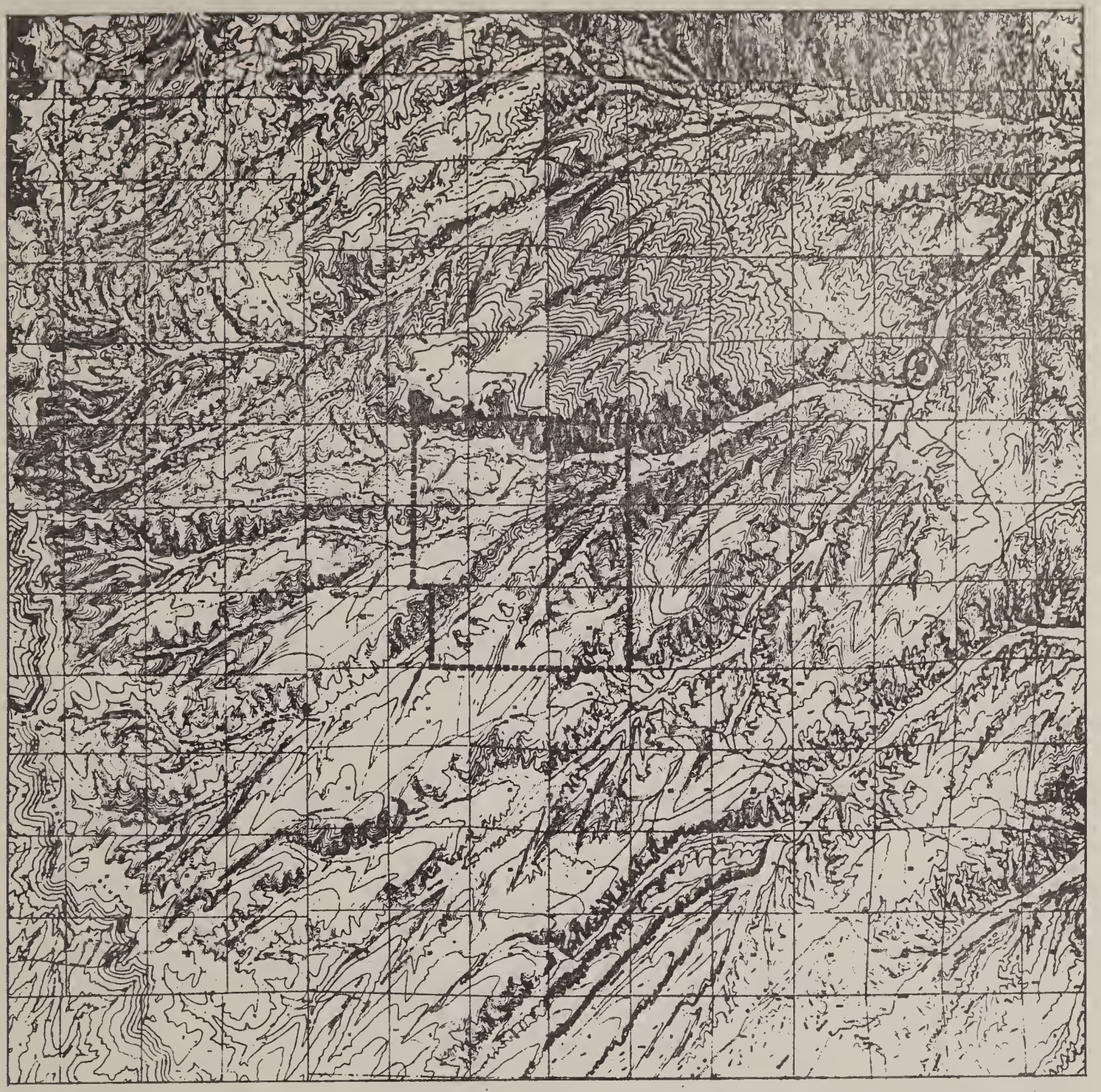
Habitat 84 near ranch

Other Information* perched on T-pole

Observer VH

* Include any distinguishing field marks for horses.

3 f



Species Rough-legged hawk Date Dec 17, 1974 Time 1500

Means of Identification Visual

Number Observed 1 ♂ ? ♀ ?

Adult ✓ Juv.

Habitat 94 mesa road

Other Information* hunting near LTH (of same day in same area)

Observer

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS



Species Buteo lagopus Date 2-17-75 Time 1210 / 1400

Means of Identification visual

Number Observed 2 ♂ ____ ♀ ____

Adult ✓✓ Juv. ____

Habitat (1.) Greasewood - sage; perched on T-pole (2) Pinyon - juniper; south slope in coral gulch

Other Information*

Observer VH + JC

* Include any distinguishing field marks for horses.



Species Buteo lagopus (Rough-legged) Date 2-19-75 Time ? Afternoon

Means of Identification Visual

Number Observed 1 ♂ _____ ♀ _____

Adult ~ Juv. _____

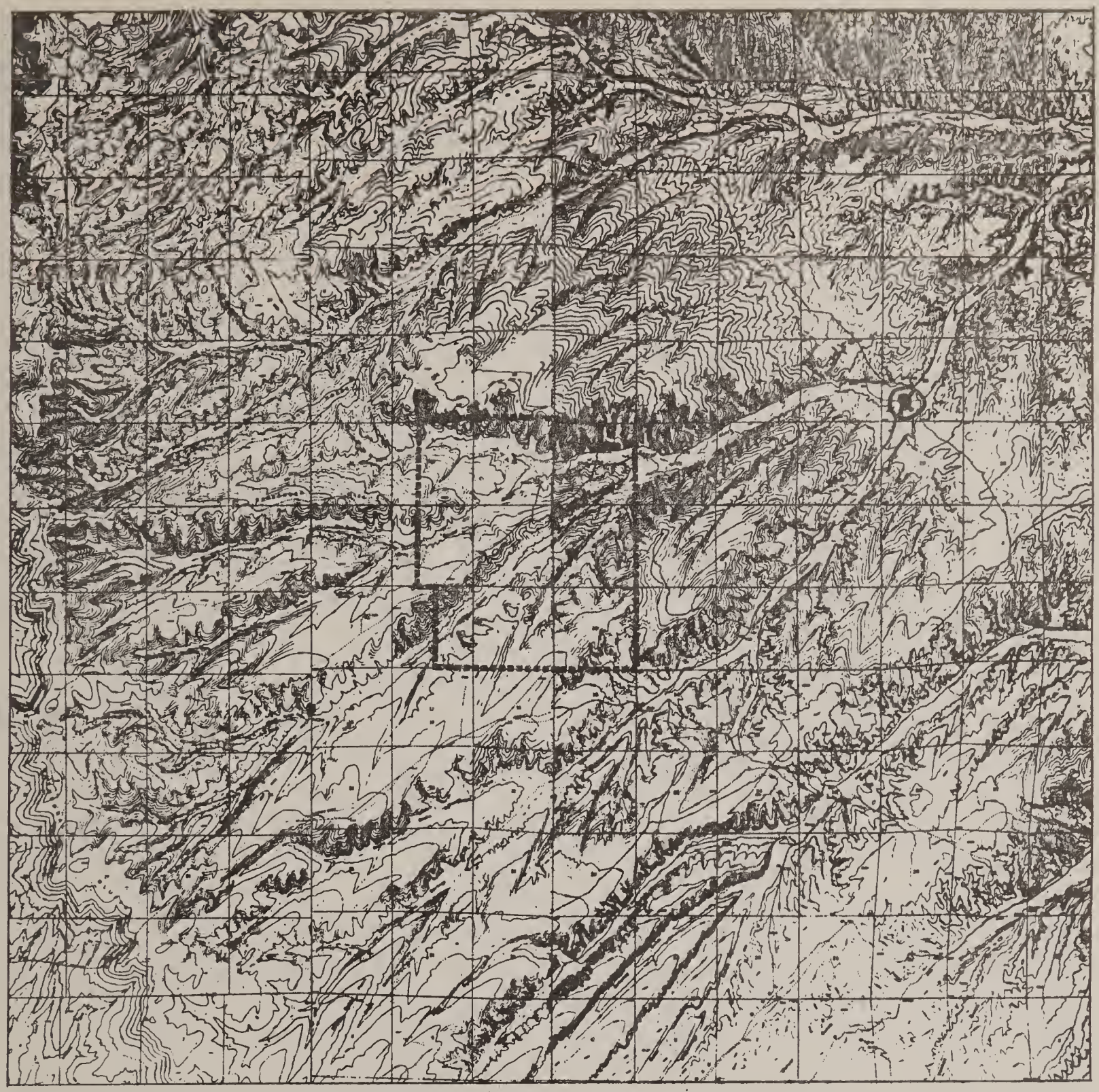
Habitat Bottomland in Corral gulch

Other Information* Soaring

Observer Van Horn

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS



Species Rough-legged hawk Date 2-19-75 Time 1300

Means of Identification photon stimulation of retina

Number Observed 2 ♂ _____ ♀ _____

Adult ✓✓ Juv. _____

Habitat 84 mesa ranch

Other Information* _____

Observer Van Horn

* Include any distinguishing field marks for horses.



Species Rough-legged hawk Date 2-21-75 Time 0800

Means of Identification visual

Number Observed 1 ♂ ____ ♀ ____

Adult ✓ Juv. ____

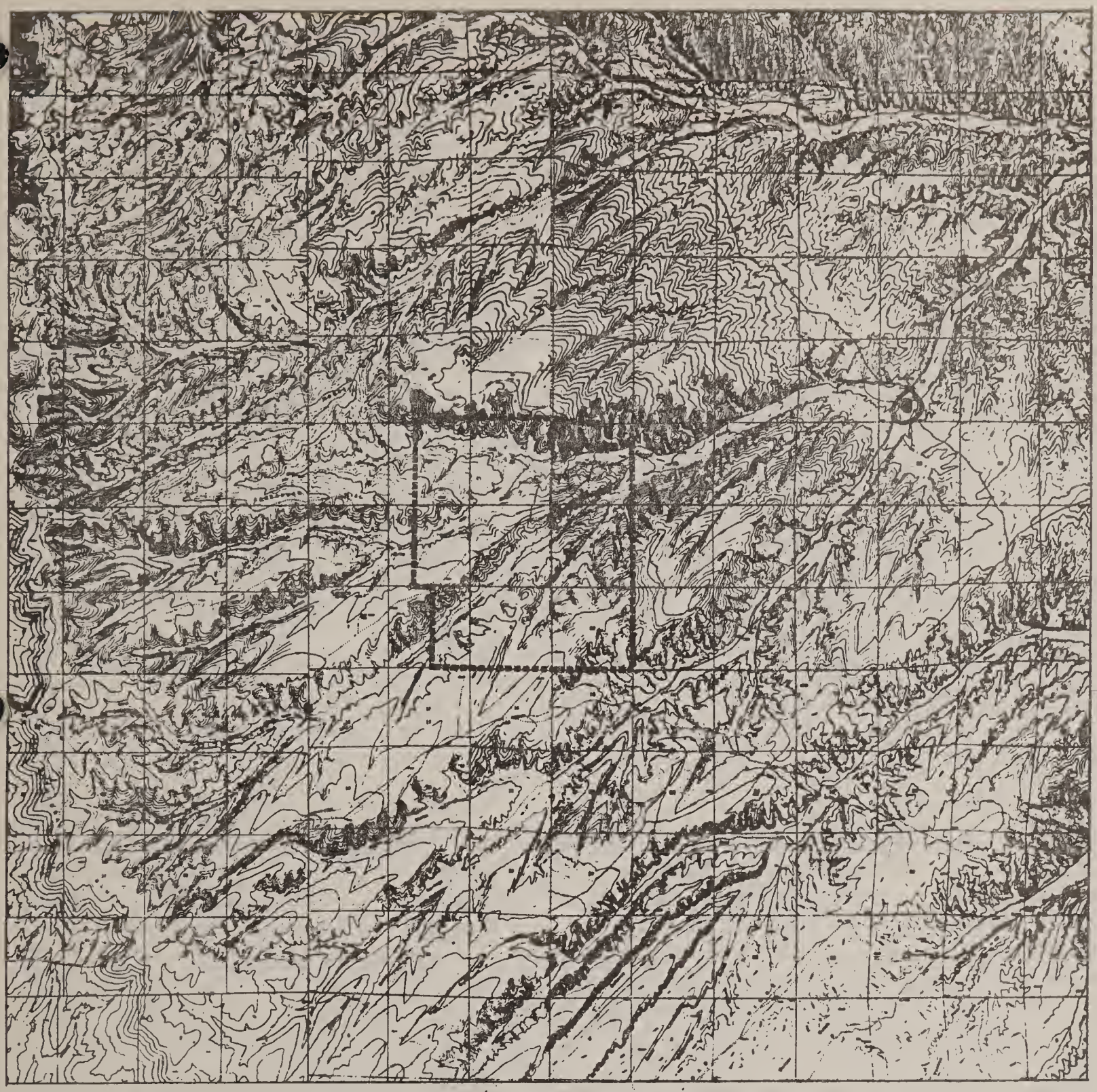
Habitat 84 mile marsh

Other Information* ____

Observer D.V.H.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS



Species Prairie falcon Date Dec 17, 1974 Time 1230

Means of Identification Visual

Number Observed 1 ♂ ? ♀ ?

Adult ✓ Juv.

Habitat Sage

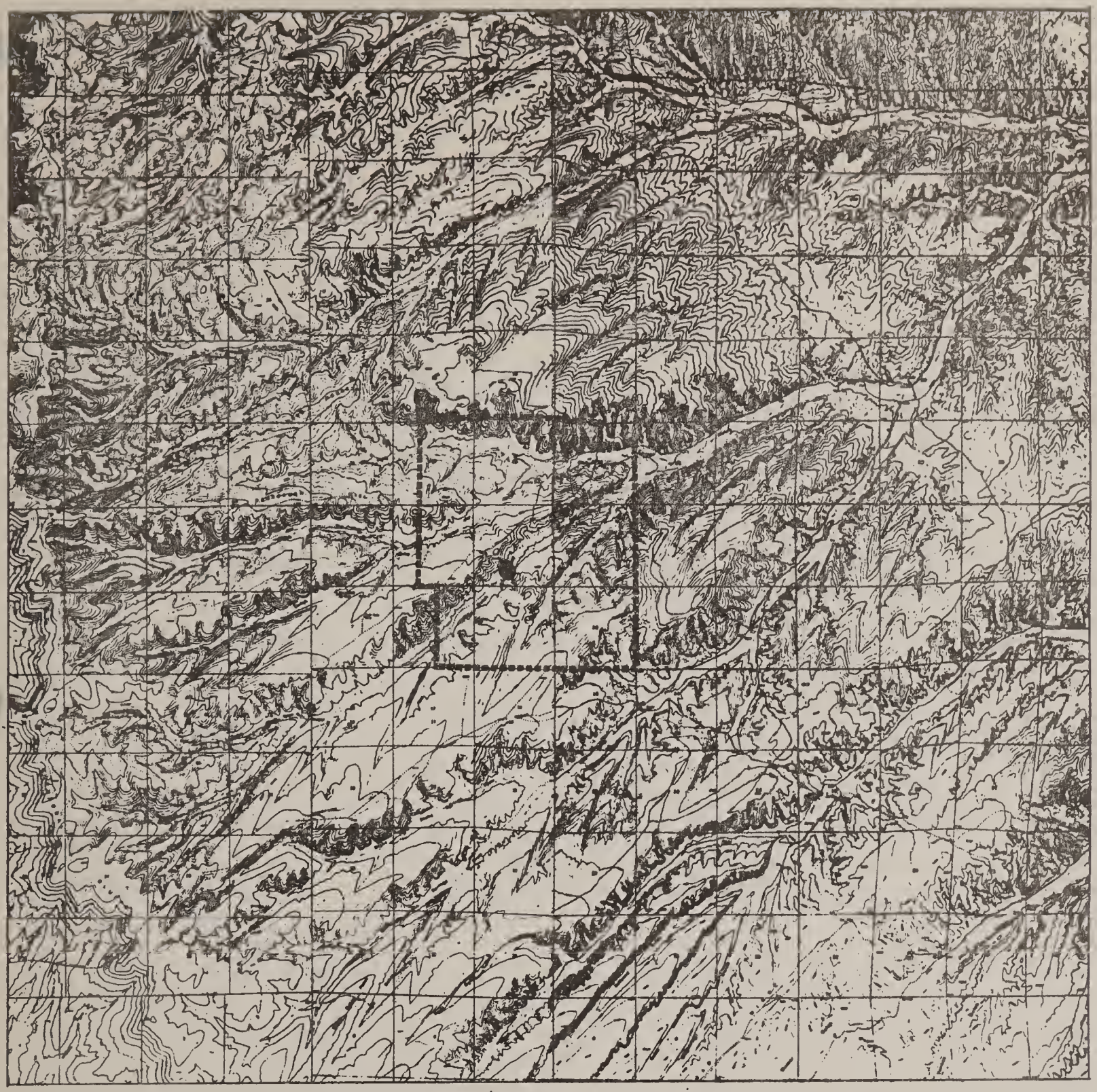
Other Information* "hampering" golden eagle

Observer VH JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

12



Species Red-tailed Hawk Date 10/10/71 Time —

Means of Identification obs.

Number Observed 1 ♂ ____ ♀ ____

Adult ____ Juv. ____

Habitat Greasewood - sage - rabbitbrush

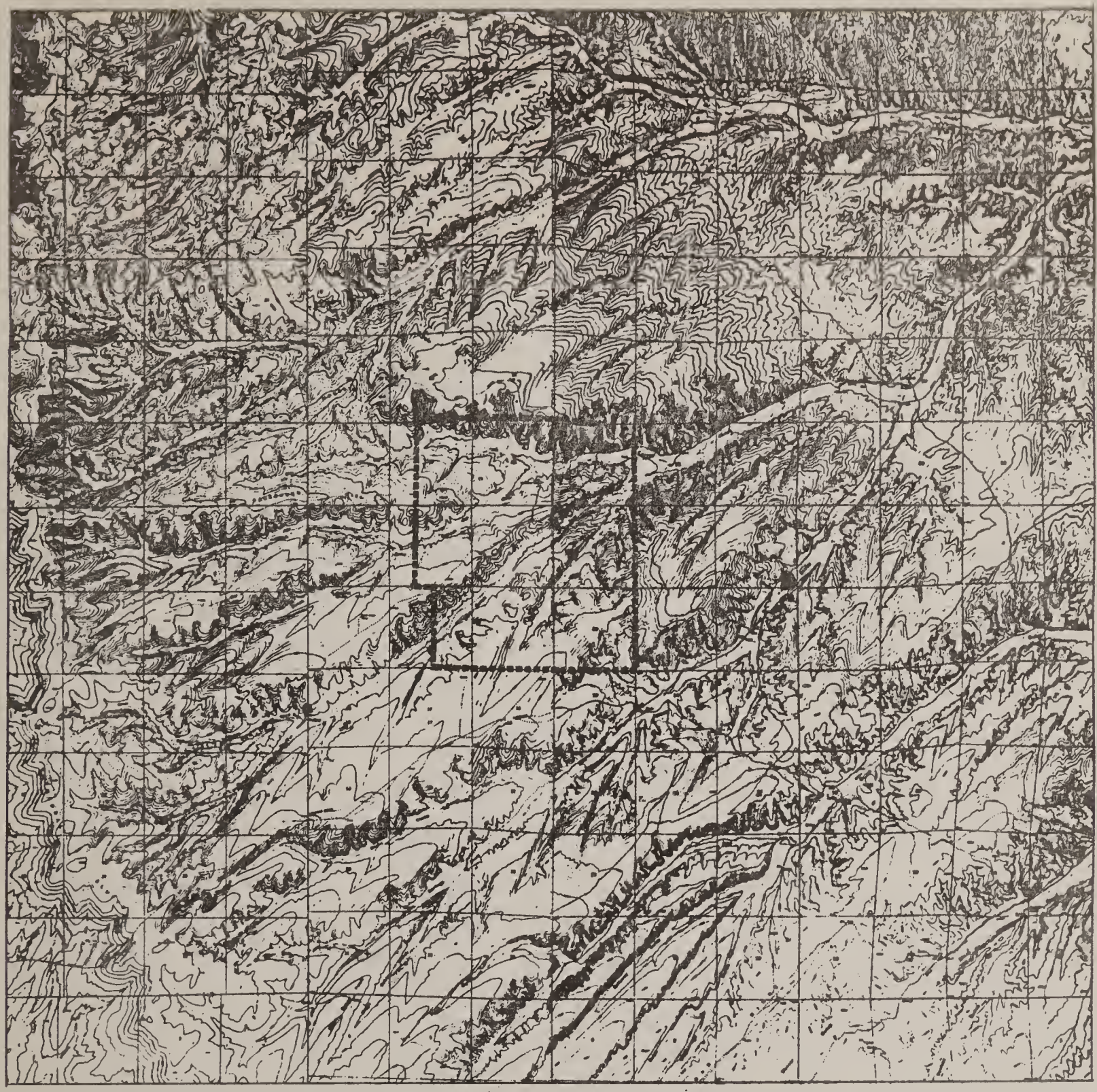
Other Information*

Observer S G Martin

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

16



Species Red-tail Hawk Date 10/15/74 Time —

Means of Identification obs

Number Observed 3 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat _____

Other Information* _____

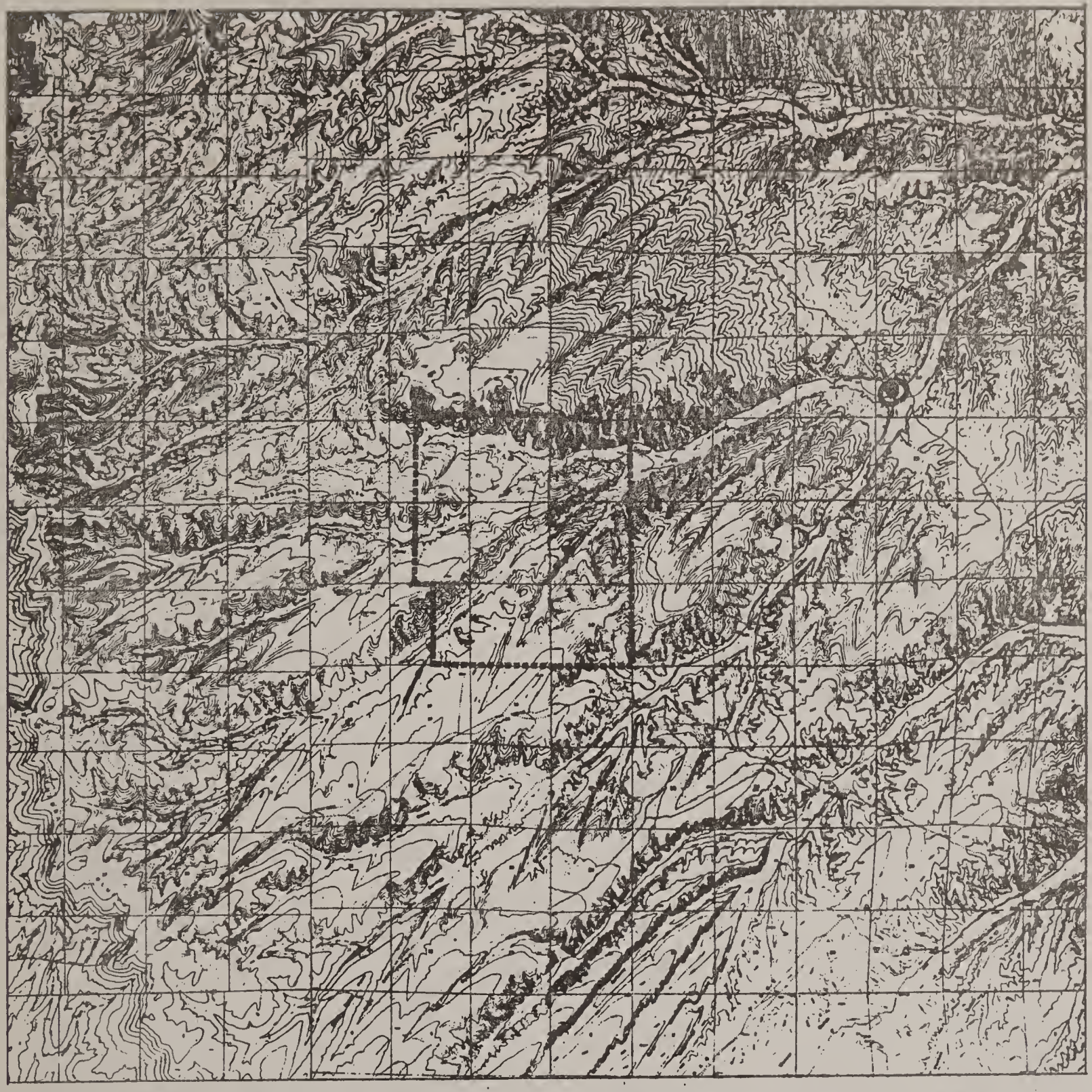
_____

Observer BK, JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3a



Species Red-tailed hawk Date Dec 17, 1974 Time 1500

Means of Identification Visual

Number Observed 1 ♂ ? ♀ ?

Adult ✓ Juv.

Habitat 84 near ranch

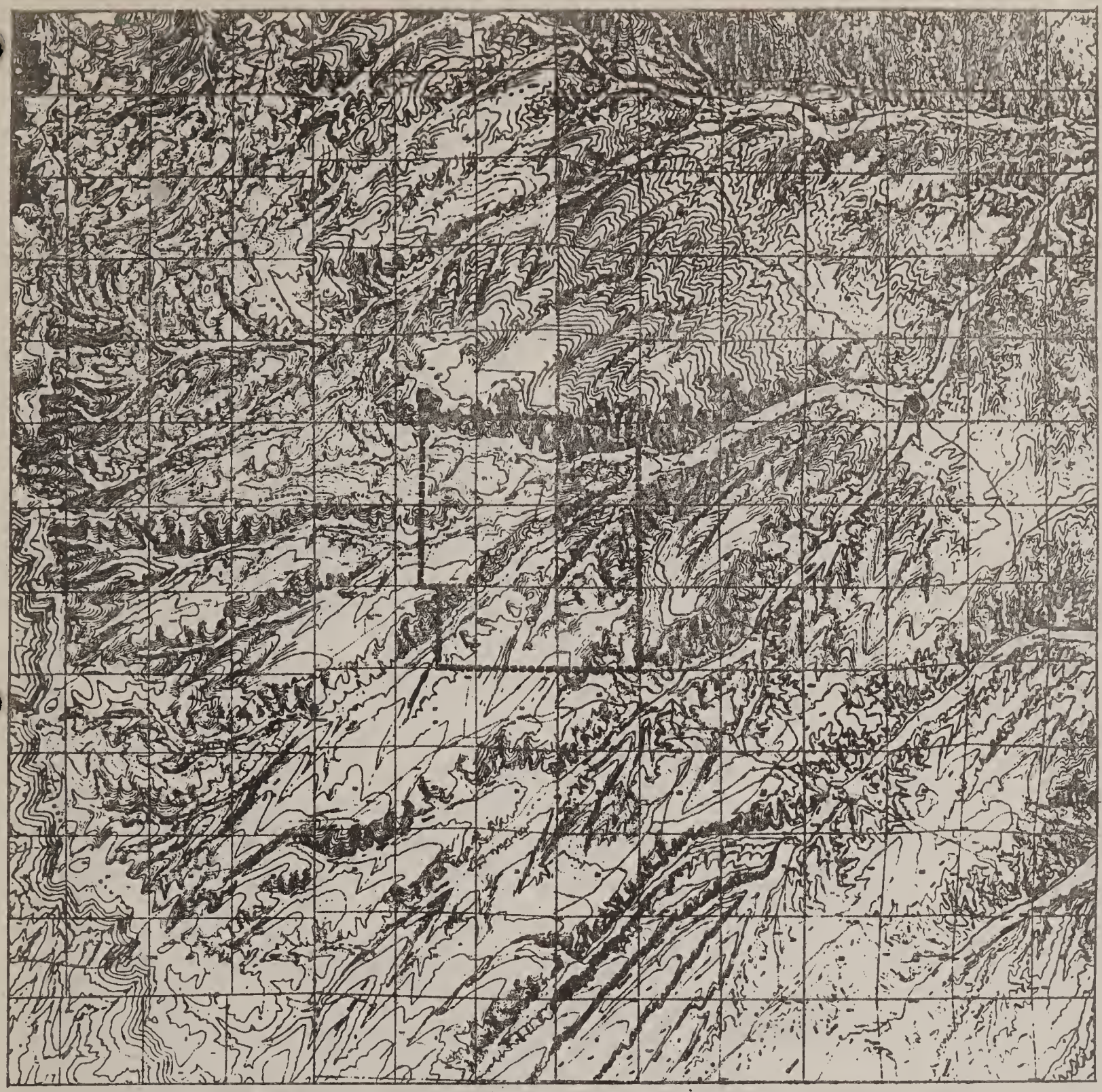
Other Information* hunting area

Observer VH JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3b



Species Red-tailed hawk Date Dec 17, 1974 Time 1230

Means of Identification Visual

Number Observed 1 ♂ ? ♀ ?

Adult ✓ Juv.

Habitat Sage

Other Information* "hovering" golden eagle

Observer VH JC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

12, 15



Species Golden Eagle Date 10/15/74 Time -

Means of Identification obs

Number Observed 2 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat _____

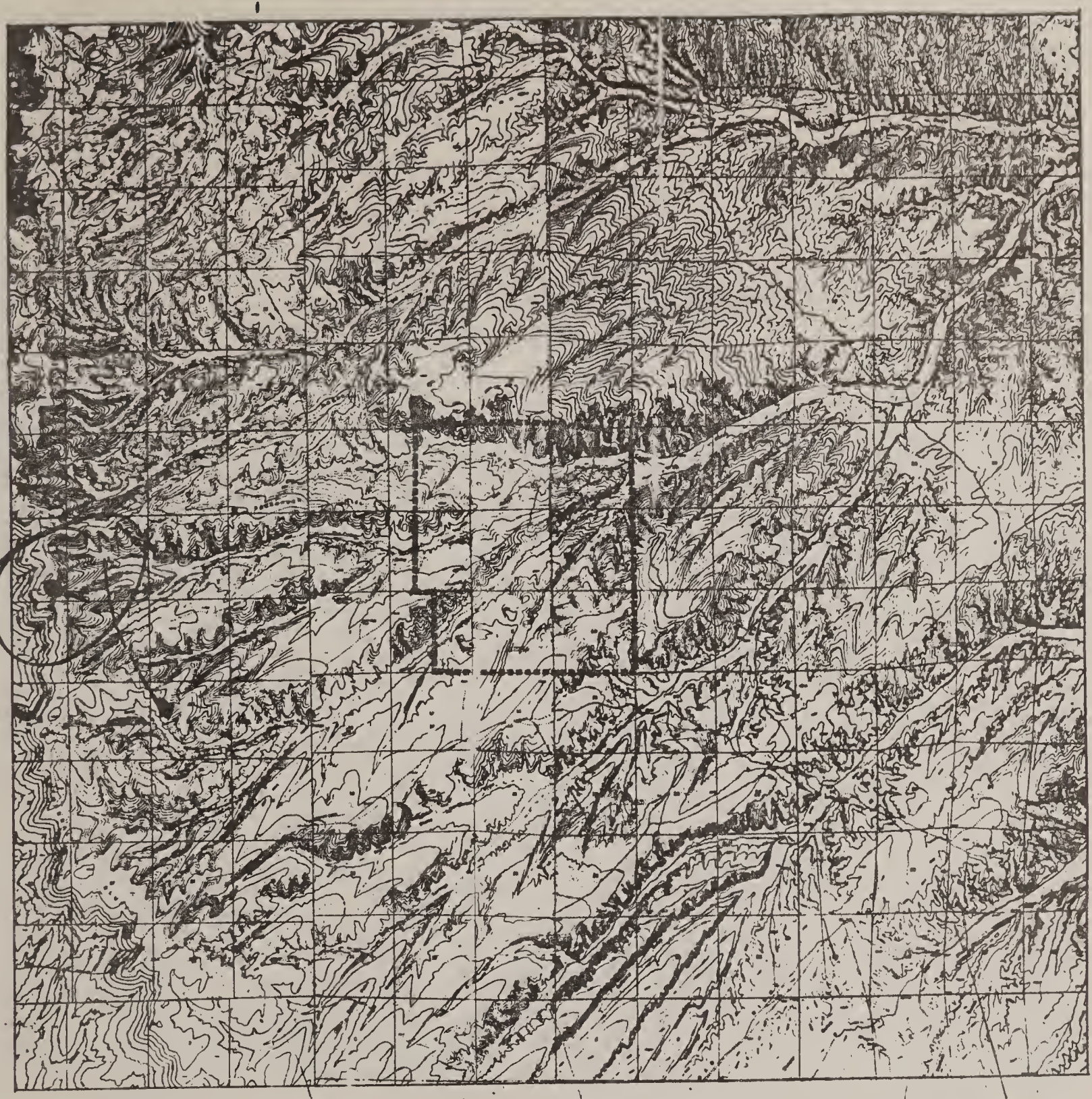
Other Information* _____

Observer JC, EK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

30



Species golden eagle Date 12/9/74 Time 1400

Means of Identification obs

Number Observed 1 ♂ ____ ♀ ____

Adult ____ Juv. ✓

Habitat sky

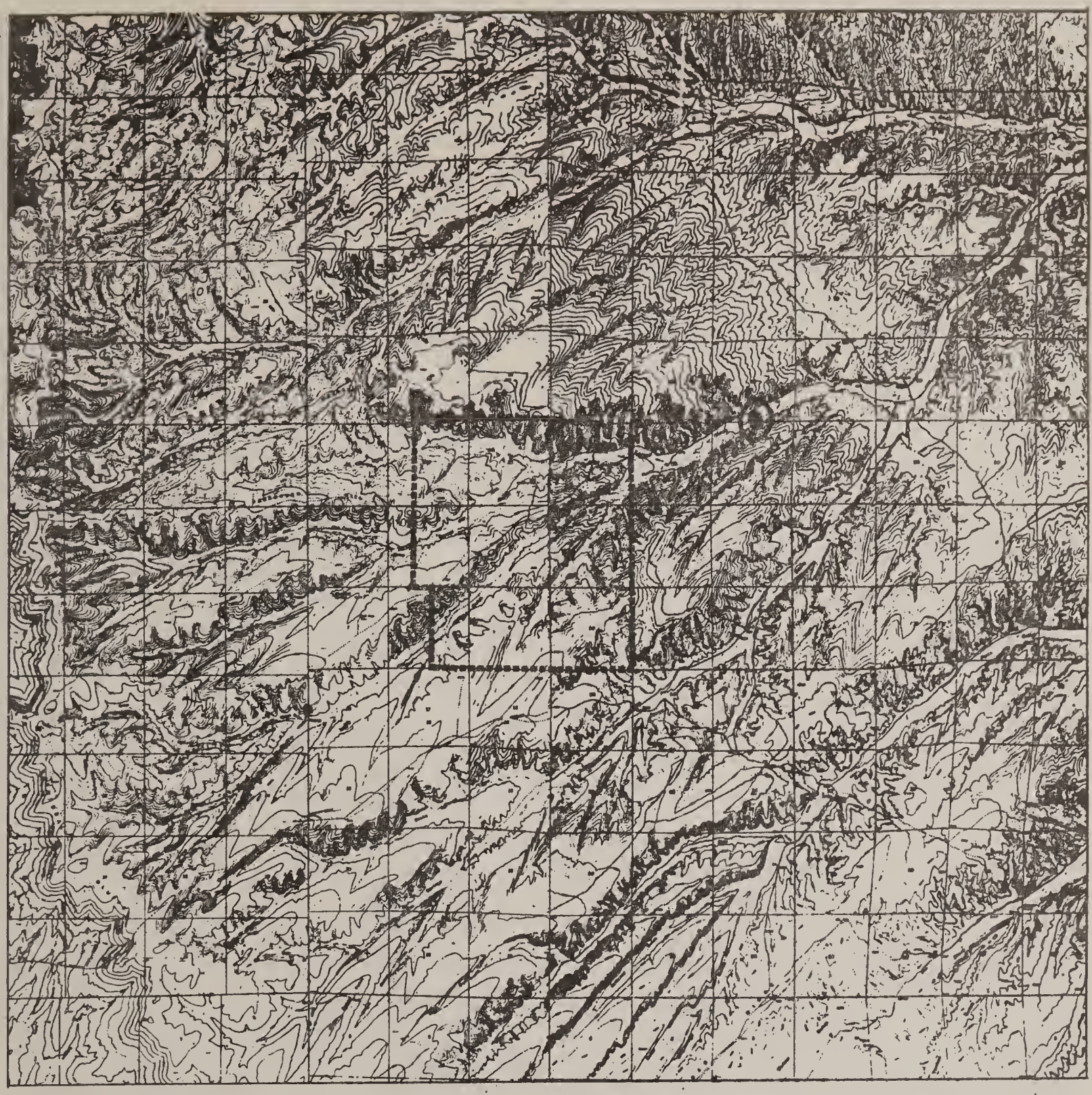
Other Information* ..lot of white on base of tail

Observer Baker / Turn

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3b



Species Golden eagle Date Dec 17, 1974 Time 1534

Means of Identification visual

Number Observed 1 ♂ ? ♀ ?

Adult ✓ Juv.

Habitat Sage - P-J.

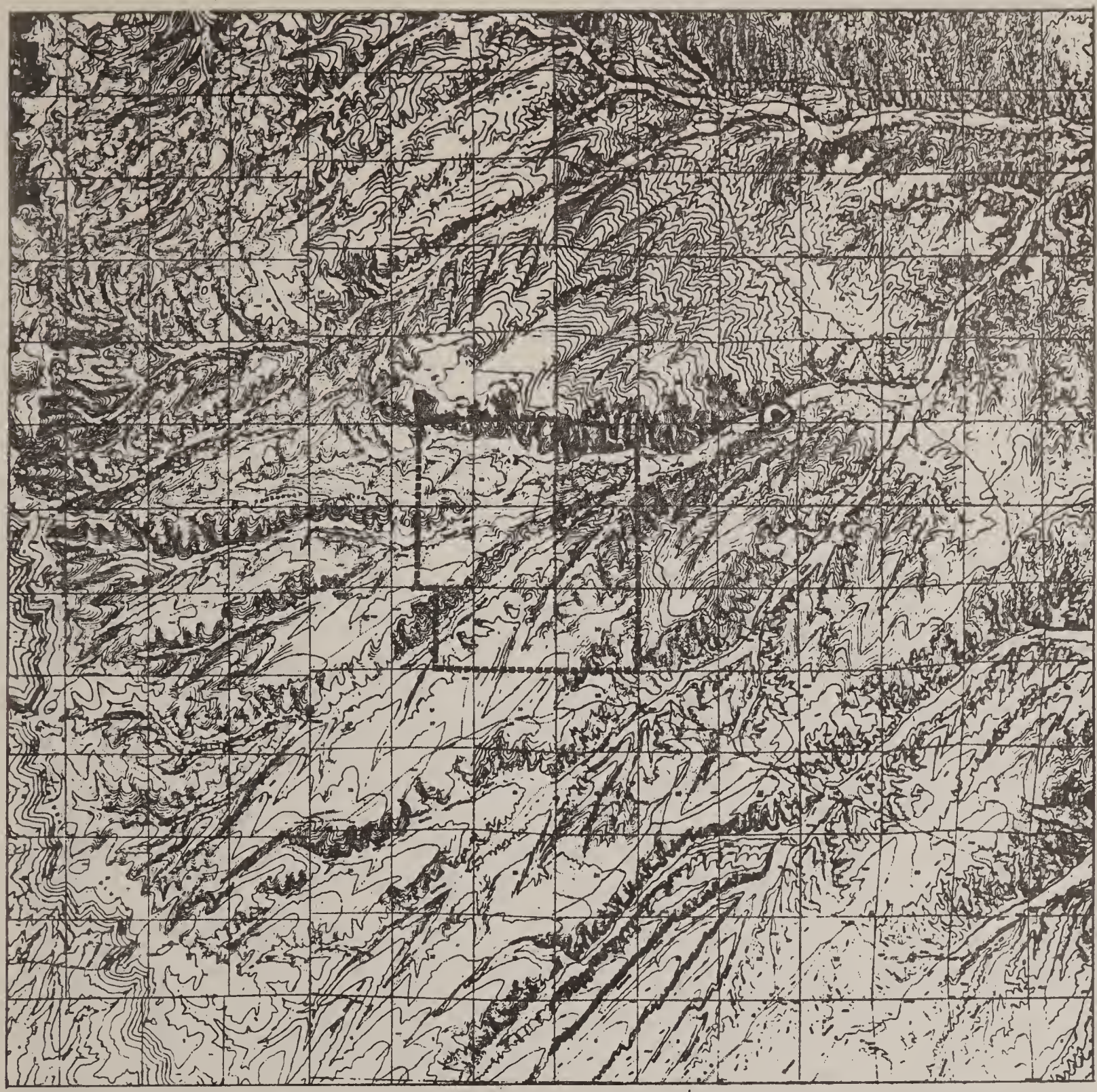
Other Information* Feeding on deer carcass (showing)

Observer VH

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

17.11.4 -75
3C



Species Golden eagle Date Dec 16, 1974 Time 1630

Means of Identification Visual

Number Observed 1 ♂ ? ♀ ?

Adult _____ Juv. ✓

Habitat Sage - PJ

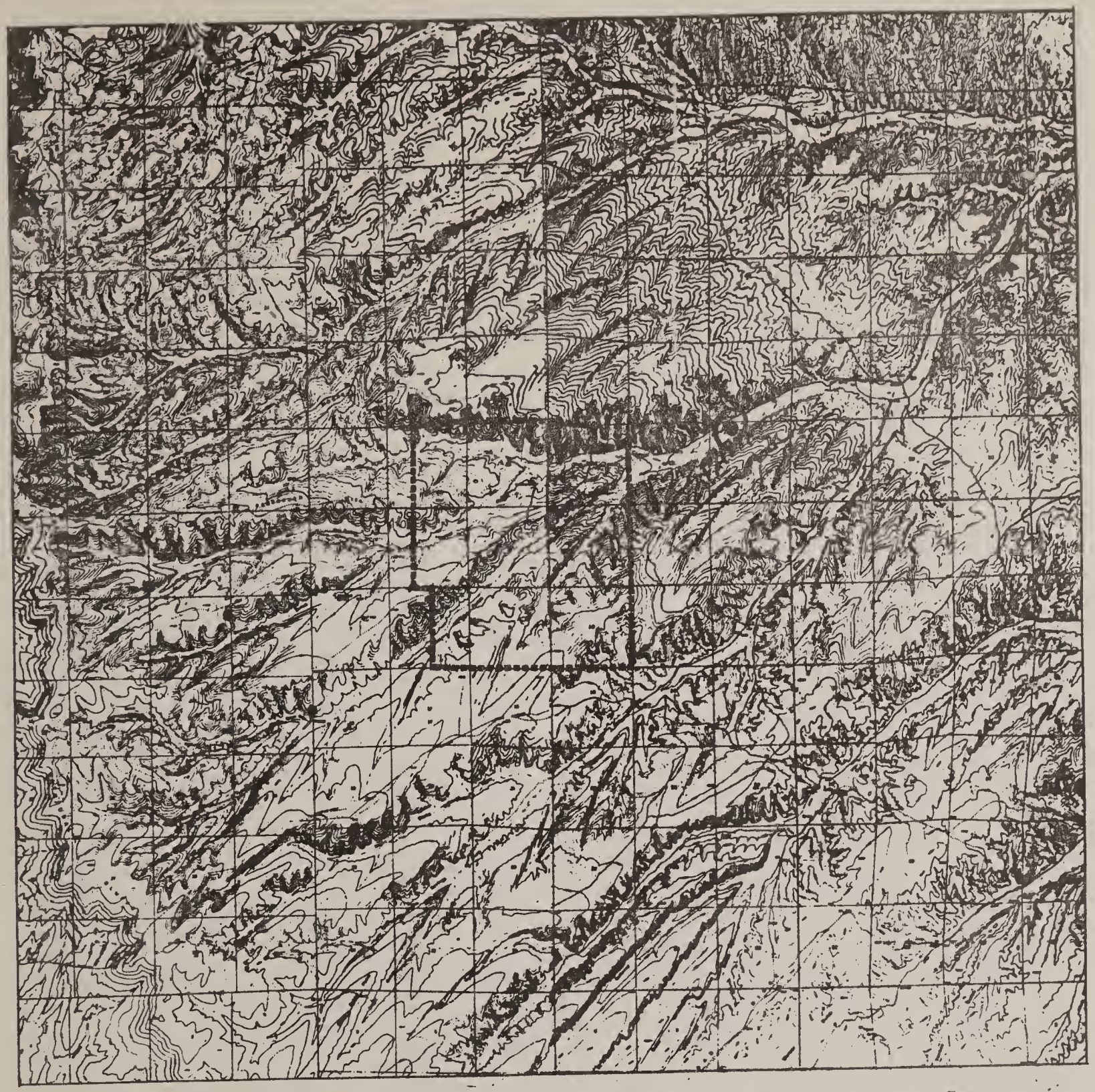
Other Information* feeding on deer carcass

Observer VK

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

3d



Species Golden Eagle Date Dec 17, 1974 Time 1530

Means of Identification Visual

Number Observed 1 ♂ ? ♀ ?

Adult _____ Juv. ✓

Habitat Rdge

Other Information* missing Primary on Rt wing, in corral guild

Observer VH

* Include any distinguishing field marks for horses.

'SK' ..

FIELD OBSERVATIONS



Species Golden Eagle Date Dec 17, 1974 Time 1230

Means of Identification visual

Number Observed 1 ♂ ? ♀ ?

Adult _____ Juv. ✓

Habitat Sage

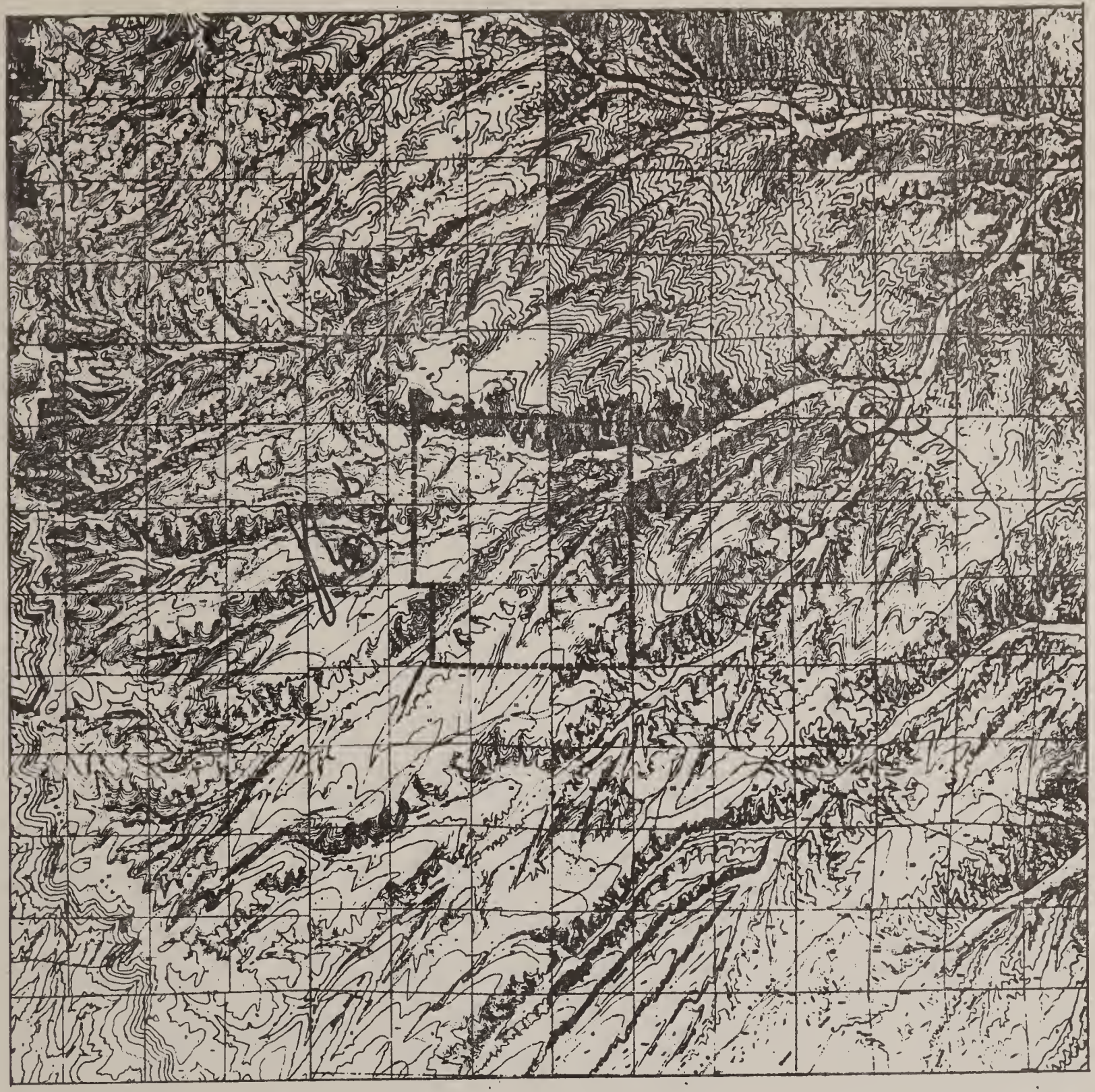
Other Information* being 'harassed' by Prairie Falcon + red-tailed hawk

Observer VH JTC

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

5a, 5b



Species Aquila chrysaetos Date 2-17-75 Time 0840/1420

Means of Identification VISUAL

Number Observed 1 ♂ ____ ♀ ____

Adult ✓✓ Juv. ____

Habitat ① Flying across sage, lit in ~ pinyon pine / ② soaring above

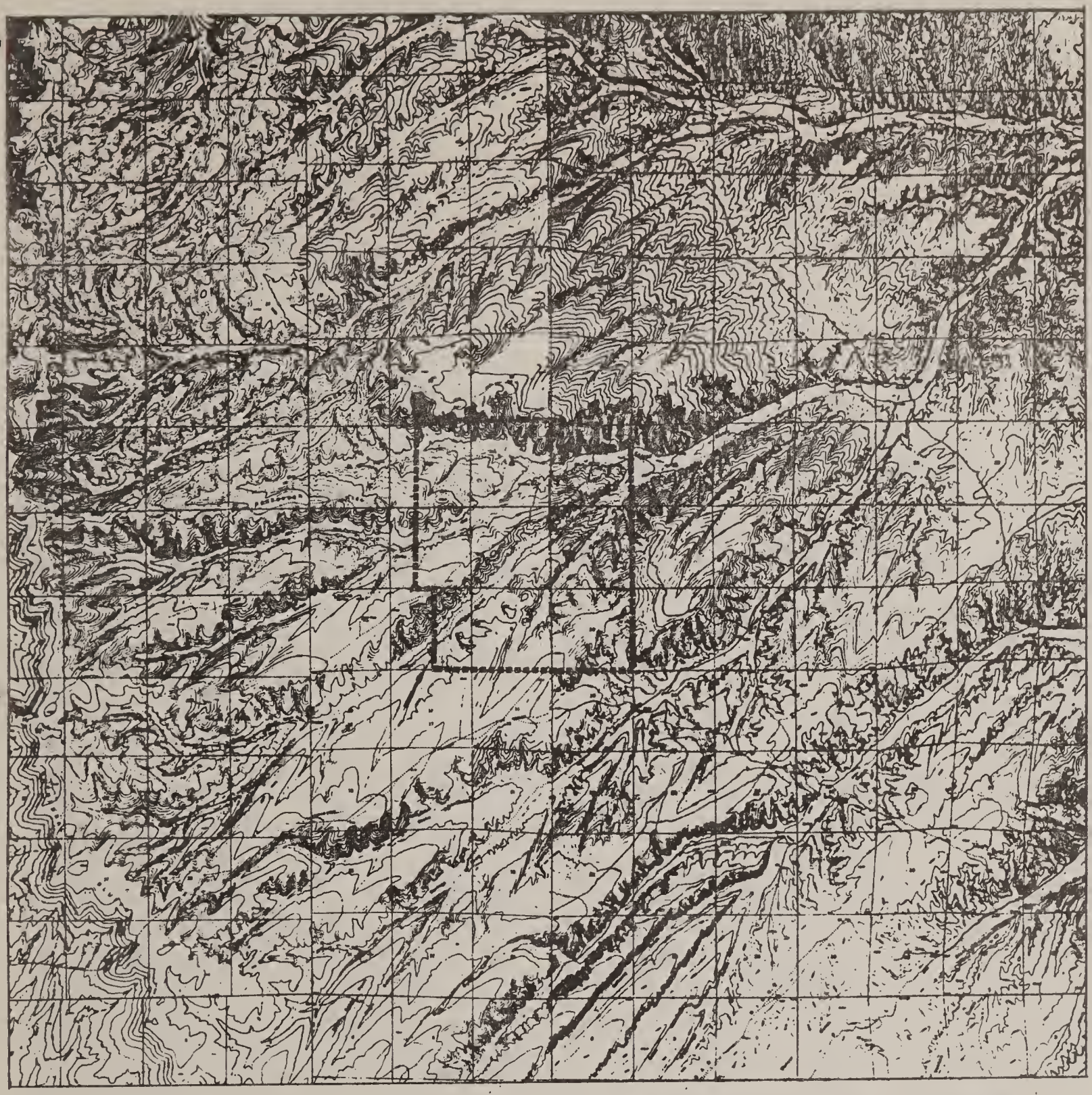
Other ~~Information~~* MTN. Shrub

Observer VH + JC

* Include any distinguishing field marks for horses.

"5C"

FIELD OBSERVATIONS



Species Golden eagle Date 2-20-75 Time 1253

Means of Identification _____

Number Observed 1 ♂ _____ ♀ _____

Adult _____ Juv. ✓

Habitat Mtn Shrub area

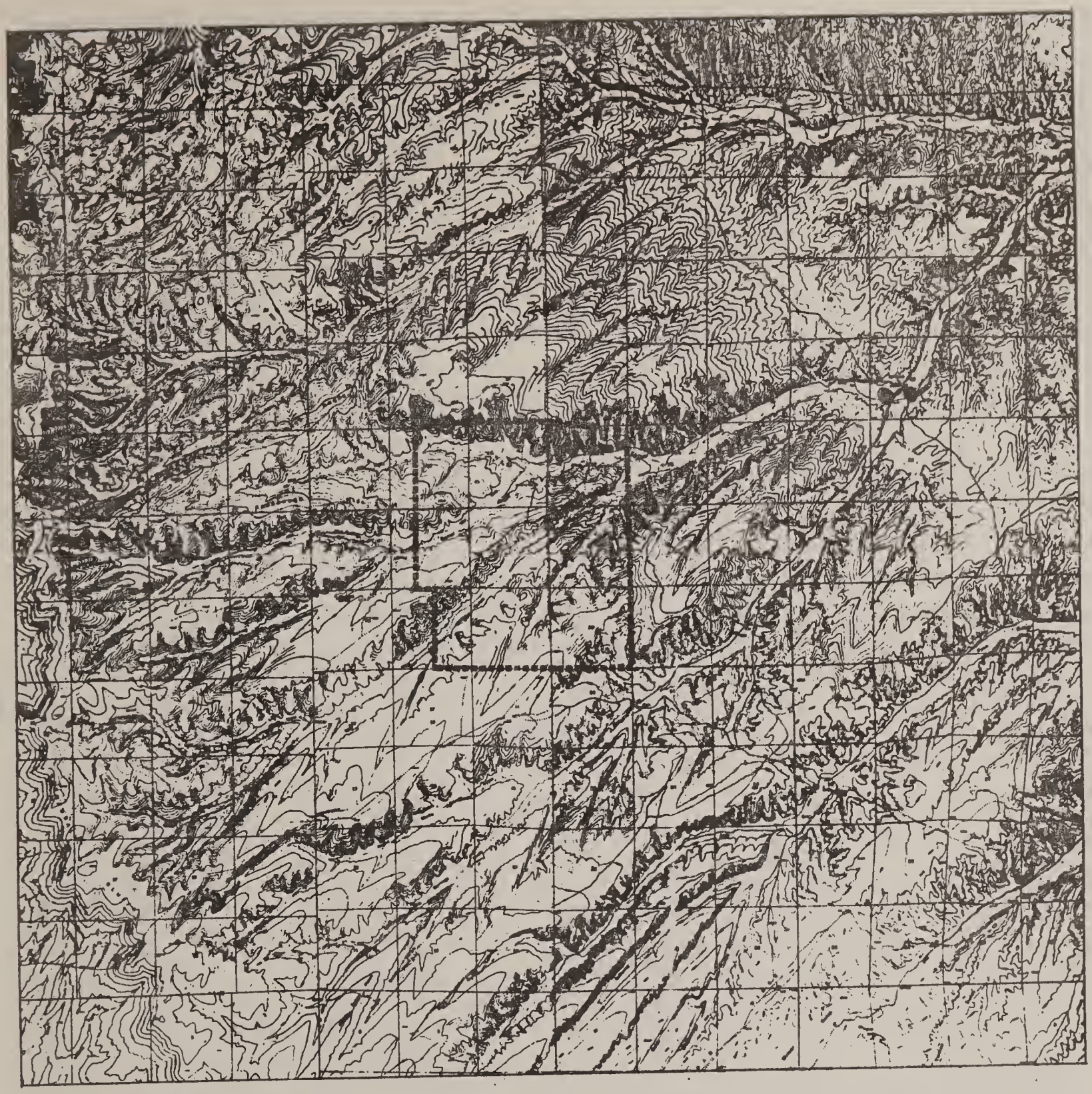
Other Information* _____

Observer D.V.H.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

5 d



Species Golden eagle Date 2-20-75 Time 0645

Means of Identification Visual

Number Observed 2 ♂ _____ ♀ _____

Adult ✓✓ Juv. _____

Habitat 84 mesa

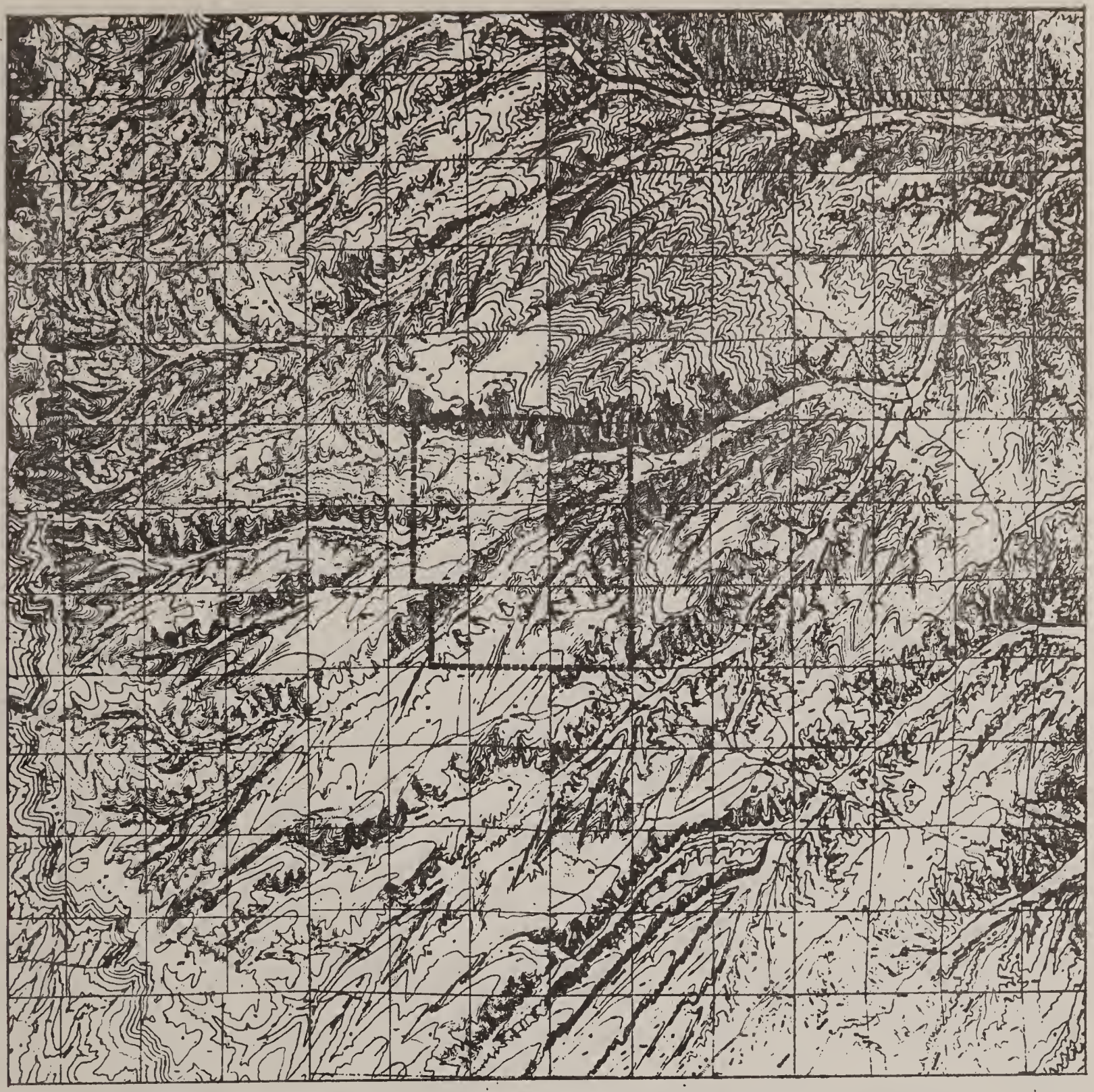
Other Information* _____

Observer VH

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS

5e



Species Golden eagle Date 2-20-75 Time 1600

Means of Identification Visual

Number Observed 1 ♂ ____ ♀ ____

Adult ✓ Juv. ____

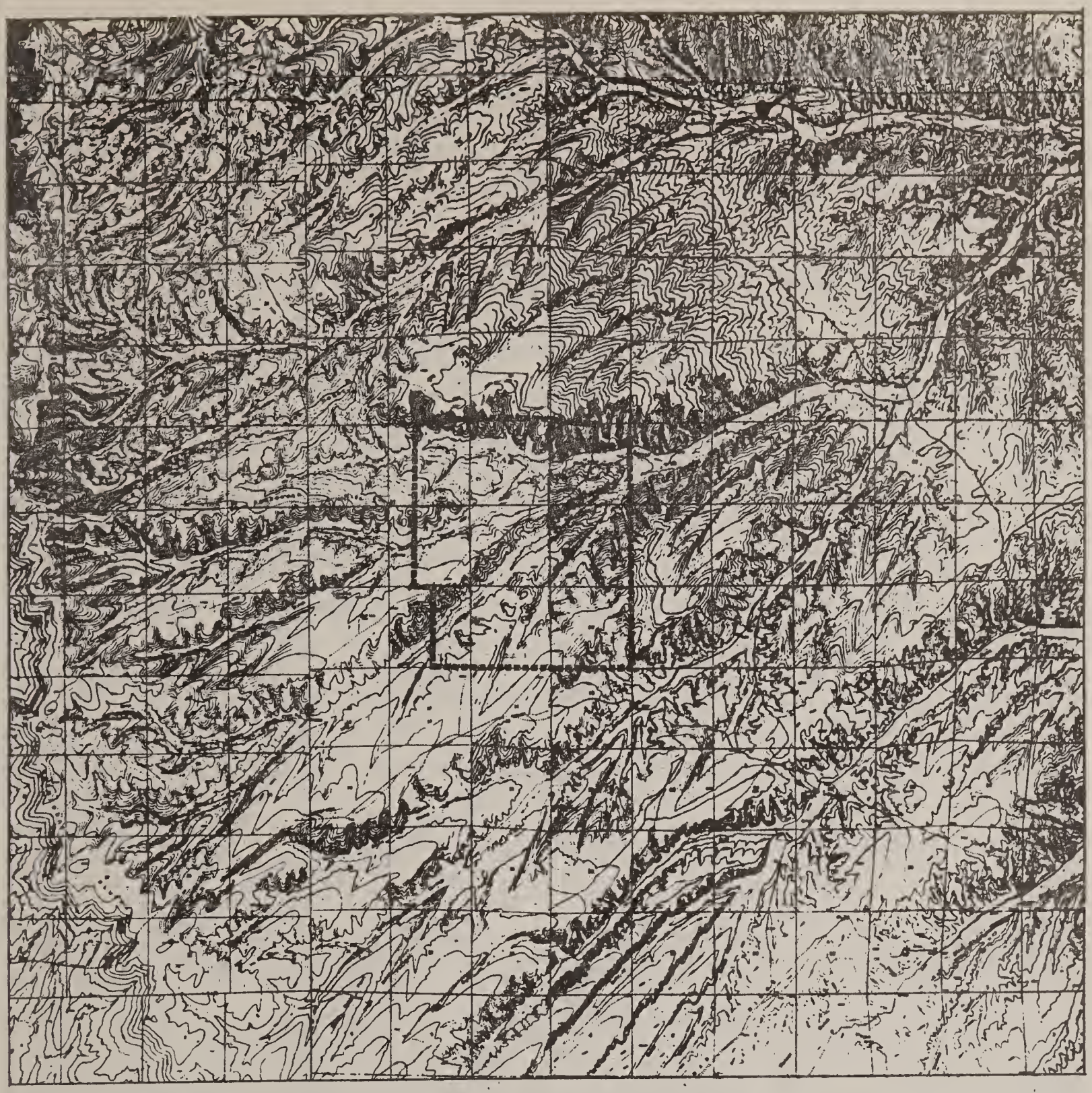
Habitat Mtn Slumb

Other Information* soaring

Observer D.V.H.

* Include any distinguishing field marks for horses.

54



Species Golden Eagle Date 2-21-75 Time 1000

Means of Identification Visual

Number Observed 1 ♂ ____ ♀ ____

Adult ____ Juv. ✓

Habitat Sage-P-J.

Other Information* hunting creek bottom

Observer D.V.H

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS



Species Golden Eagle Date 2-21-75 Time 1100

Means of Identification Visual

Number Observed 2 ♂ ____ ♀ ____

Adult ~~ Juv. ____

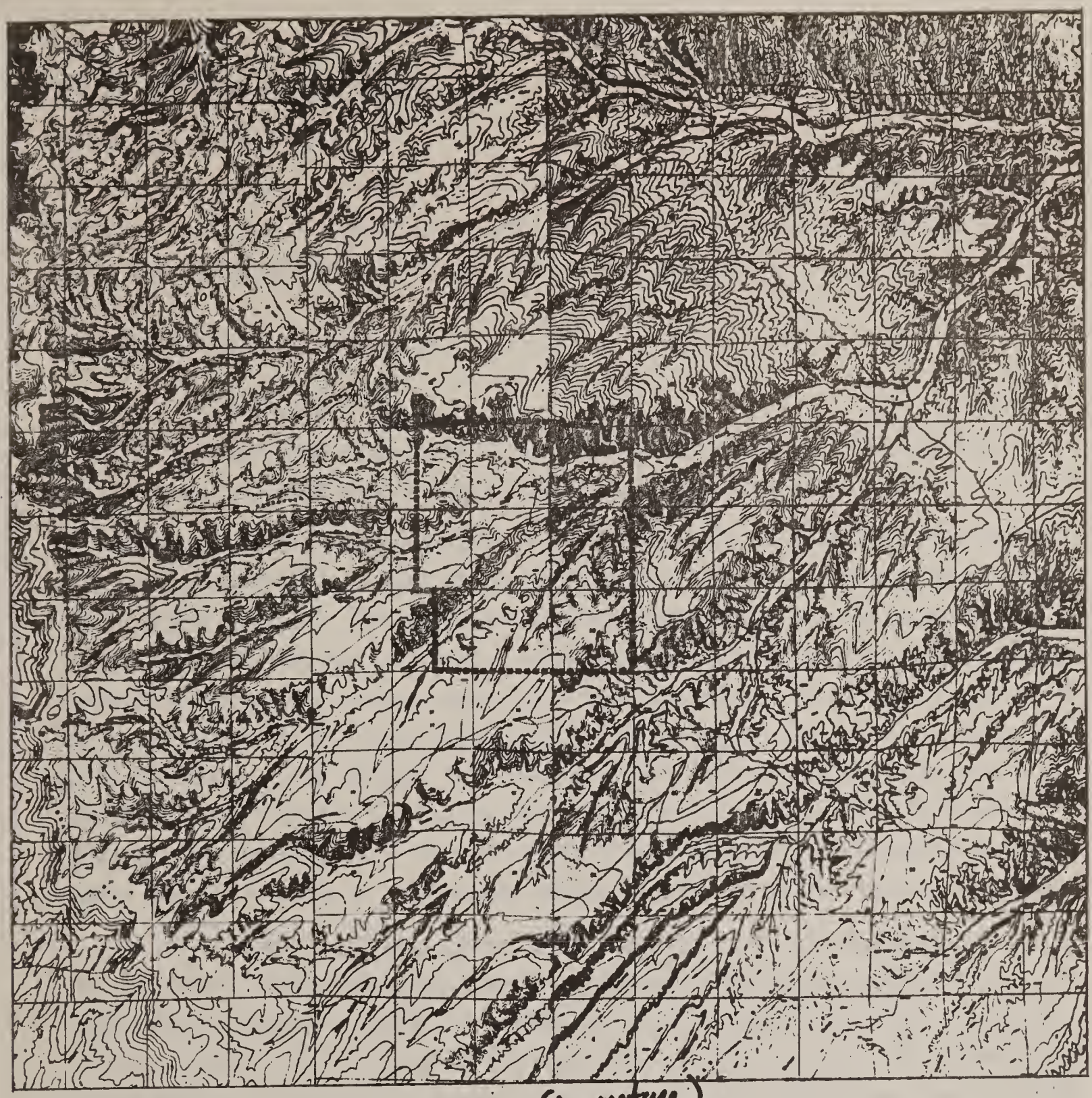
Habitat P-J.

Other Information* hunting slopes

Observer D.V.H.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS



Species Bald & Golden Eagles (immature) & Common Raven Date 2/21 Time 11:30

Means of Identification Sighting

Number Observed 1 of each ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat Bottomland

Other Information* The 3 birds were soaring together. The imm. golden eagle dove at the bald eagle and at nearly the same time the raven dove at the golden eagle. The birds remained soaring for some time and the raven

Observer Concolosi

* Include any distinguishing field marks for horses.

2.3.8. REPTILES AND AMPHIBIANS

2.3.8.1. INTRODUCTION

The purpose of the reptile and amphibian sampling program is to determine habitat preference, distribution and, when possible, abundance of species of reptiles and amphibians occurring on and near Tract C-a.

2.3.8.2. METHODS AND MATERIALS

Lizard Grids

A lizard sampling program is being initiated during May, 1975 and continued over a 2-year period during May, June, August and September.

Previous studies by ECI personnel in the vicinity of Tract C-a have shown that lizard species are most abundant on rocky south-facing slopes vegetated with pinyon-juniper. Two grids are established in this habitat type, one on and one adjacent to Tract C-a. Each grid consists of 49 stations permanently marked with numbered stakes, in a 7 x 7 configuration. Stations are spaced at intervals of 15 m. This spacing coincides with the center of the large 7.29 ha mammal grids (Figure 11). The on-tract lizard grid utilizes the existing mammal grid B located in the pinyon-juniper habitat on the south-facing slope (Figure 14). The off-tract lizard grid site is selected during early May, 1975 after a preliminary reconnaissance of likely lizard habitats.

For each sampling period, these grids are sampled for 3 days during hours of increased reptile activity (this is dependant mainly upon ground temperature, cloud cover, and wind speed). Lizards are live captured by hand with a monofilament noose. Each lizard is distinctively marked by unique toe-clipping combinations and released. For each lizard captured, the species, sex, weight, microhabitat (type of substrate or vegetation on which the lizard was first seen), grid location, and condition of the tail (intact, broken or regenerated) is recorded on a standard field data sheet (Figure 41). Weight is determined to the nearest 0.5 g with a Pesola spring scale.

LIZARD GRID FIELD DATA SHEET

2.3.166

Grid #:_____ Location:_____ Project #:_____

Date Time of Location:_____ Collector(s):_____

Capture Location	Species	Sex	Age Class	Toe Clip No.	Total Weight	Container Weight	Animal Weight	Additional Notes*

Line Transects and Breeding Site Visits

Line transect methods are employed to sample reptiles and amphibians in all major habitat types on and near Tract C-a. Five transects, each approximately 1000 m (3820 ft) in length, are run by two observers during each sampling period. Individual transects are run only once and are located within a given habitat type. Transects are relocated during each sampling period such that each major habitat type is sampled at least once during the two year period. Species, numbers, microhabitat type, sex and age class (when possible), various environmental parameters, and other data are recorded on a standard field data sheet (Figure 42).

Qualitative information regarding nocturnally active amphibian species is gathered opportunistically by ECI field personnel. Two nights during the May and June sampling periods are devoted to sampling potential amphibian breeding sites (ponds) on and near Tract C-a. Species, number, habitat description, sex and age class are recorded on a standard field data sheet (Figure 43).

The first individual of each species encountered in the area is killed by an injection of phenobarbital and prepared as a voucher specimen.

The initial reptile and amphibian sampling period occurs during May 9-14, 1975. The data obtained from this sampling will be included in the Second Quarterly Report.

HERPETOFAUNA TRANSECT FIELD DATA SHEET

2.3.168

Transect #____ Vegetation Type_____ Location_____

Date_____ Time, Ground Temp. at Start_____ Time, Ground Temp. at End_____

Ground Cover (%)_____ Wind Speed_____ Observer(s)_____ Project_____

Species	Approximate Perpendicular Distance From Transect	Microhabitat Type	Sex	Age Class	Additional Observations*

*Reproductive condition, broken tail, etc.

Figure 42. Herpetofauna transect field data sheet for Rio

AMPHIBIAN COLLECTION SHEET 2.3.169

Project #:_____

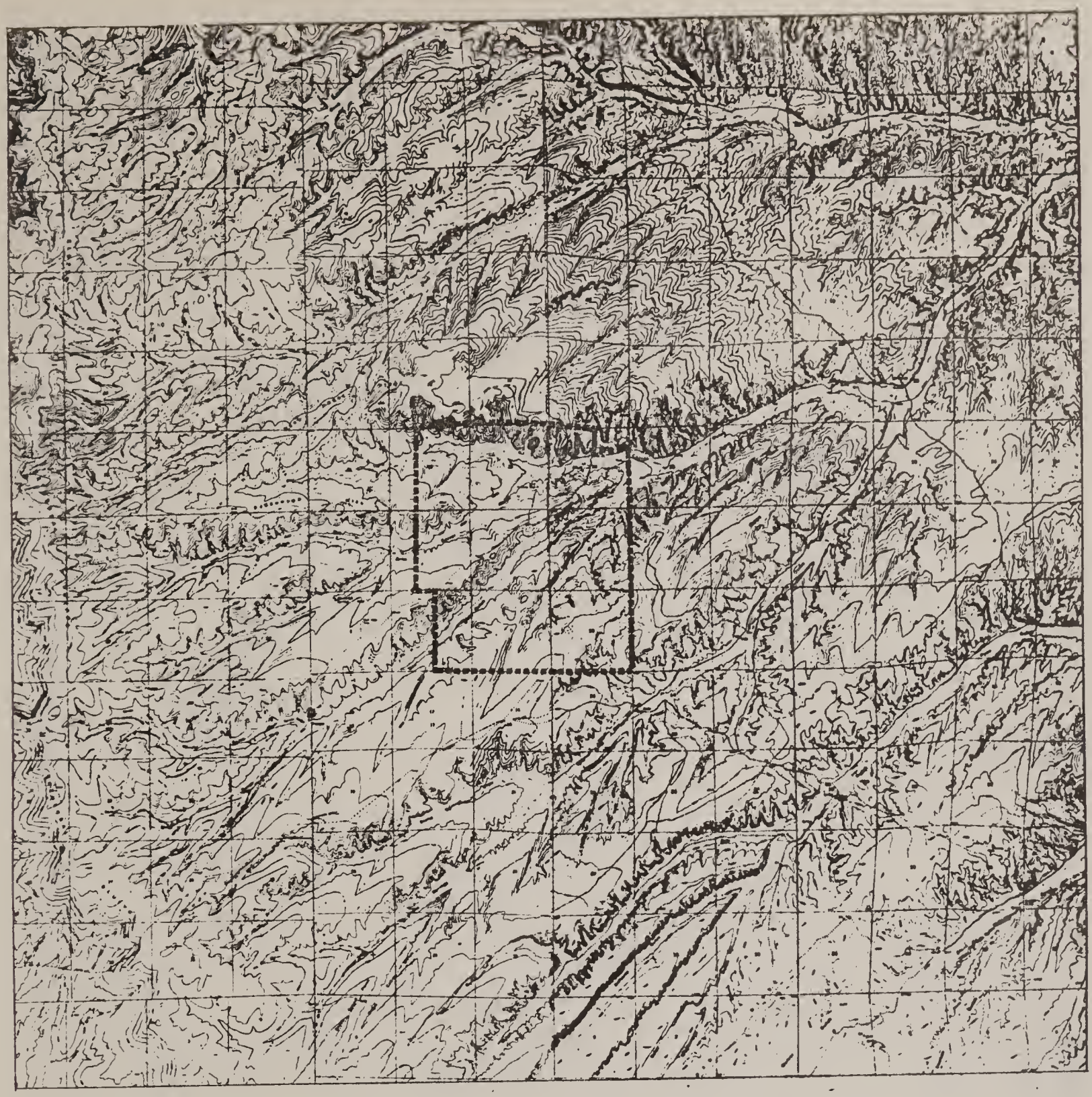
Date	No.	Species	Sex	Age Class	Capture Location	Habitat Description	Collector	Additional Notes *

Reptiles and Amphibians (14.1.5)

Distribution Records

FIELD OBSERVATIONS

1a



Species Cervus elaphus Date 10/14/74 Time —

Means of Identification obs. caught

Number Observed 1 ♂ ____ ♀ X

Adult ____ Juv. X

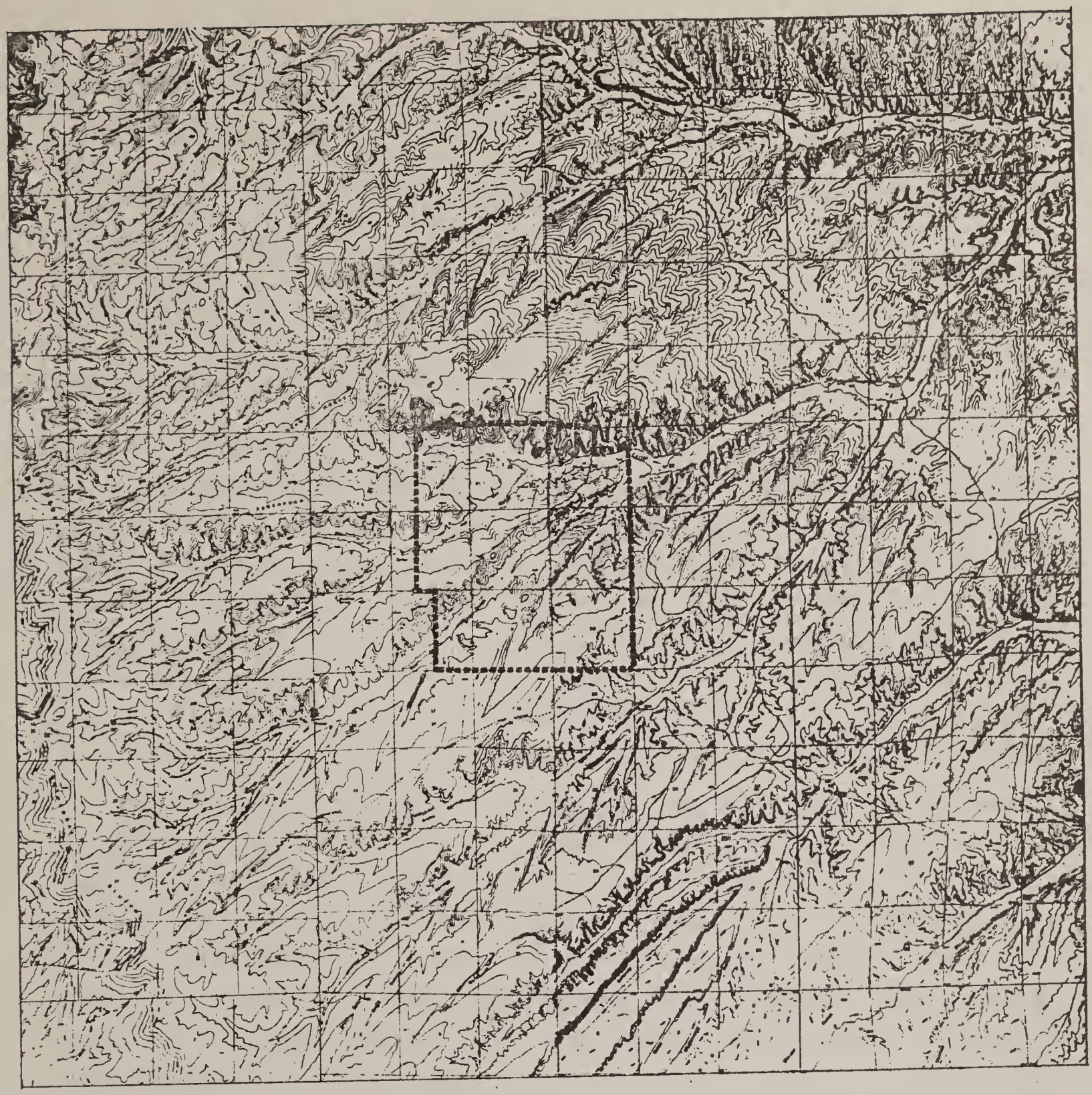
Habitat Ponderosa Pine Grass-forb

Other Information*

Observer TT.

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS



Species Eptesicus gracilis Date 10/14/71 Time —

Means of Identification obs. color

Number Observed 1 ♂ _____ ♀ _____

Adult _____ Juv. X

Habitat [illegible]

Other Information* _____

Observer RT

* Include any distinguishing field marks for horses.

2.3.9. INVERTEBRATES

2.3.9.1. INTRODUCTION

The invertebrate sampling program is designed to survey invertebrate groups in major habitat types within the site vicinity, identify important groups based on relative abundance and biomass, and for these to describe habitat requirements or preference.

2.3.9.2. METHODS AND MATERIALS

Collection of Samples

Field sampling is conducted at five sites during May, June and September of 1975 and 1976. The sampling sites have been selected in order to place heavy concentration on the major vegetation types found in this area. Sagebrush, pinyon-juniper and mixed brush comprise over 90% of the habitat in this area with the first two dominant, therefore, two stations are set up in these areas and one in the latter. All stations coincide with those used for vegetation and small mammals as follows: greasewood-sagebrush - grid A; sagebrush - grid D; pinyon-juniper - grids B and C; and mixed brush - grid E (Figure 14).

Field sampling involves five basic operations, each designed to capture a particular group of invertebrates. Ground dwelling active species are captured by pitfall jars. Five pitfalls, each of which consists of a glass container placed in the ground with the top rim at ground level and partially filled with a preservative (glycerin), are operated for 3 days and nights at each site per sampling period. A funnel with the cup diameter equal to the diameter of the glass container is placed inside the jar to reduce contamination and evaporation of preservative.

To capture mobile airborne invertebrate species and species which fly a portion of the time, one malaise trap, an open fronted tent of nylon net (Townes, 1972), is placed at each sampling site. It is left out for 5 days and nights during each sampling period.

Invertebrate species found in association with large, shrubby vegetation are sampled by quick trap and D-Vac suction units. The quick trap, a metal

frame trap covered with screen (Mason and Blocker, 1972) and delineating an area of 0.5 sq m (5.4 sq ft), is dropped over the plant to prevent escape by invertebrates. The D-Vac unit is then used to remove invertebrates on the plant and ground by suction; any litter which has accumulated at the plant base is also sampled with the field portable vacuum cleaner. Four quick trap samples will be taken at each plot during each sampling period. Where the vegetation is predominantly grasses and forbs, four 50-sweep net samples will be used to sample invertebrates. All samples collected are labeled and preserved in alcohol for laboratory analysis.

General observation of plant damage by invertebrates, inspection of microhabitats not sampled (carcasses, logs, tree bark), opportunistic sampling of plant galls and fast flying or occasional invertebrate transients on the sampling plots, and counts of harvester ant nests per unit area (if harvester ants are a predominant local species) are also conducted. The latter is accomplished by counting ant hills on the aerial photographs obtained for other purposes. Photographs of representative insect damage situations are taken for identification and analysis.

Laboratory Analysis of Samples

Invertebrates are identified to family, separated to species groups on the basis of morphological characteristics, and counted. Because positive identifications to species are not made on the majority of insects in these samples, all specimens which possess morphological similarities suggestive of their being the same species are separated into a group and assigned a reference number. This unit is referred to as a species group. Biomass per family per sampling time is estimated by using International Biological Program data based on numbers per sample of known biomass. Groups deemed important in terms of abundance or biomass are identified to species, where feasible, and confirmed by entomologists of the Smithsonian Institution or by other recognized experts. Access to the Colorado State University insect collection also aids in identification of specimens. A series of specimens of important species is mounted on pins and the rest are stored in alcohol vials. All specimens of important species are given a reference number and placed in permanent storage boxes for future reference in the ECI museum collection.

Invertebrate samples will be collected during May 9-14, 1975 and subsequently analyzed in the laboratory. The results of these analyses will be included in the Second Quarterly Report.

2.3.10. DOMESTIC LIVESTOCK

2.3.10.1. INTRODUCTION

Numbers of livestock on the study area are being determined and areas of concentration are being estimated on a seasonal basis to define the extent and type of grazing pressure exerted by domestic herbivores.

2.3.10.2. METHODS AND MATERIALS

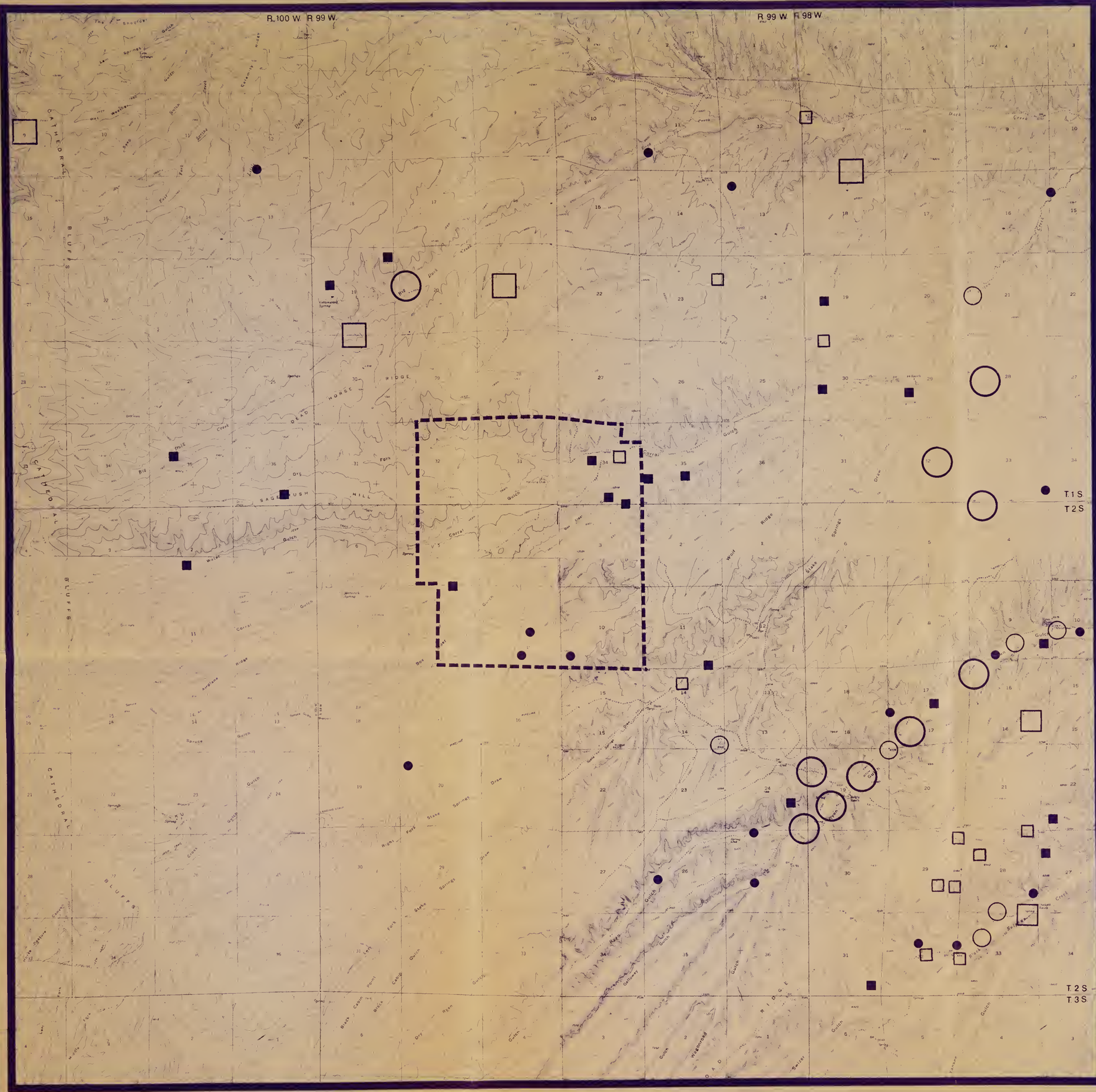
Data regarding grazing history and tract use by domestic livestock are being obtained from Bureau of Land Management (BLM) cattle allotment records. These records contain information on stocking rates, animal numbers, and season of utilization in the vicinity of Tract C-a.

Aerial censuses are being used to determine the locations of domestic livestock within the area of investigation. The domestic livestock censuses are conducted bimonthly in conjunction with the elk and feral horse aerial censuses. Since the censuses are conducted concurrently, the data gathering procedures are identical to those described in section 3.6.2.6. When livestock are sighted during the aerial censuses, location and number of individuals are recorded into cassette tape recorders.

Department of Interior policies dictate that analysis of range production and utilization are conducted and that information regarding vegetation types, condition, and productivity be current. These qualitative data, compiled for most land administered by the BLM, will be obtained and analyzed, if available for federal lands on the study area.

2.3.10.3. RESULTS AND DISCUSSION

Aerial surveys of domestic livestock have been conducted in conjunction with the elk and feral horse counts on November 8 and December 30, 1974. Most of the cattle observed were distributed on 84 Mesa and Wagon Road Ridge during the November survey, with small scattered groups observed in the bottom of Corral Gulch and Boxelder Gulch on Tract C-a (Figure 44). During the December survey, cattle were concentrated along Ryan Gulch. Cattle were also



TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

DOMESTIC LIVESTOCK

AERIAL CENSUS

APPROXIMATE LOCATIONS

NOVEMBER 8, 1974

1 – 5 ■

6 – 15 □

MORE THAN 15 □

DECEMBER 30, 1974

1 – 5 ●

6 – 15 ○

MORE THAN 15 ○

0 1/2 1 2 miles

NORTH

ECI

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Fort Collins, Colorado

R. 100 W. R. 99 W.

R. 99 W. R. 98 W.

CATHEDRAL BLUFFS

HORSE RIDGE

DEAD HORSE CREEK

SAGEBRUSH HILL

Big Duck Creek

Dry Fork

Corral Gulch

Stake Springs Draw

Calamity Ridge

Lam Springs Gulch

Wet Weather Gulch

Seep Spring

Cottonwood Spring

Maverick Spring

Drill Hole

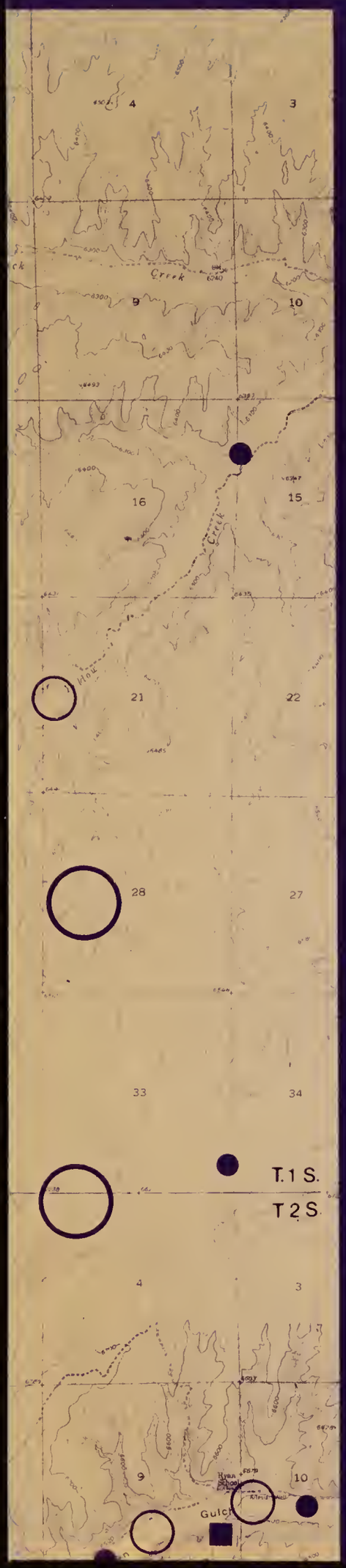
Trail

Jeep

Reservoir

Corral

Fence



TERRESTRIAL ECOLOGICAL INVESTIGATIONS

RIO BLANCO OIL SHALE PROJECT

DOMESTIC LIVESTOCK

AERIAL CENSUS

APPROXIMATE LOCATIONS

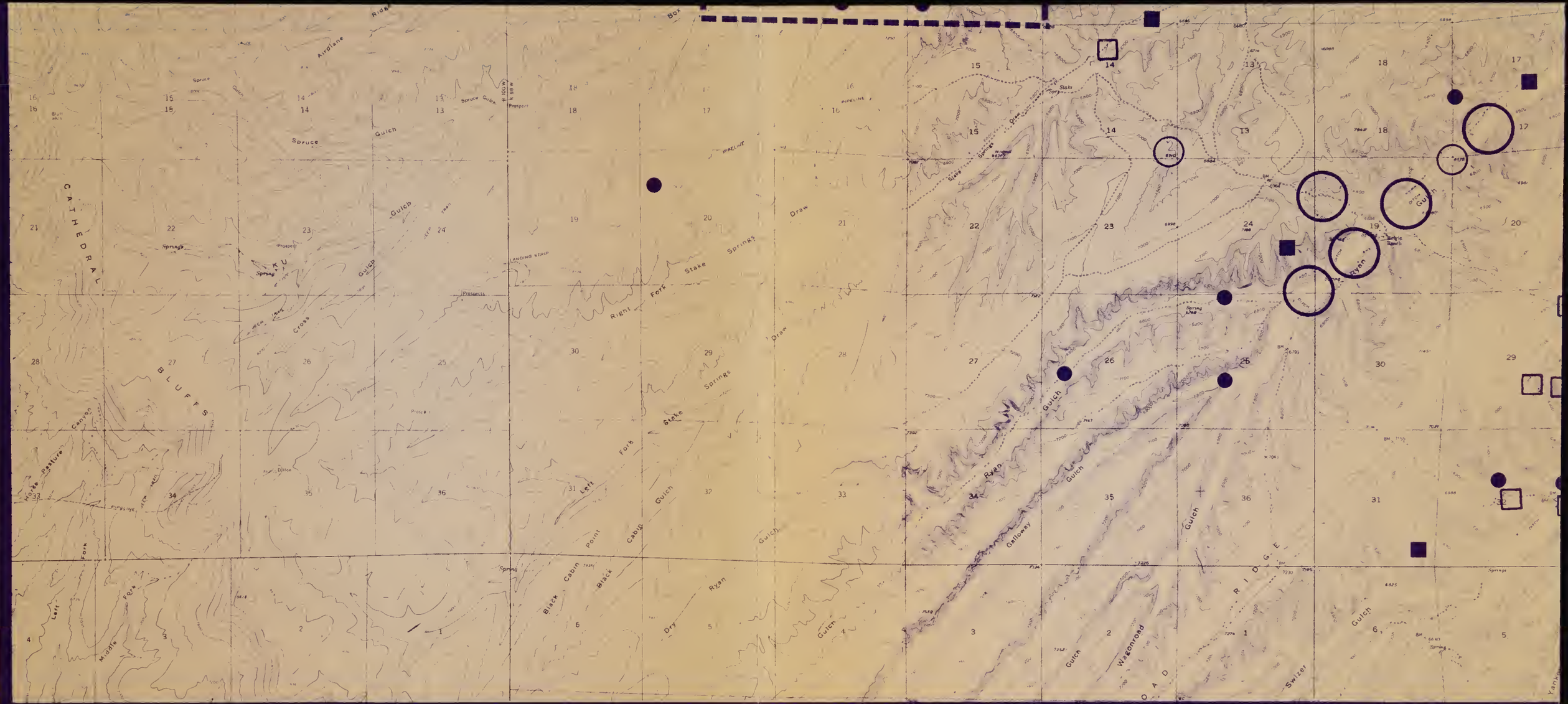
NOVEMBER 8, 1974

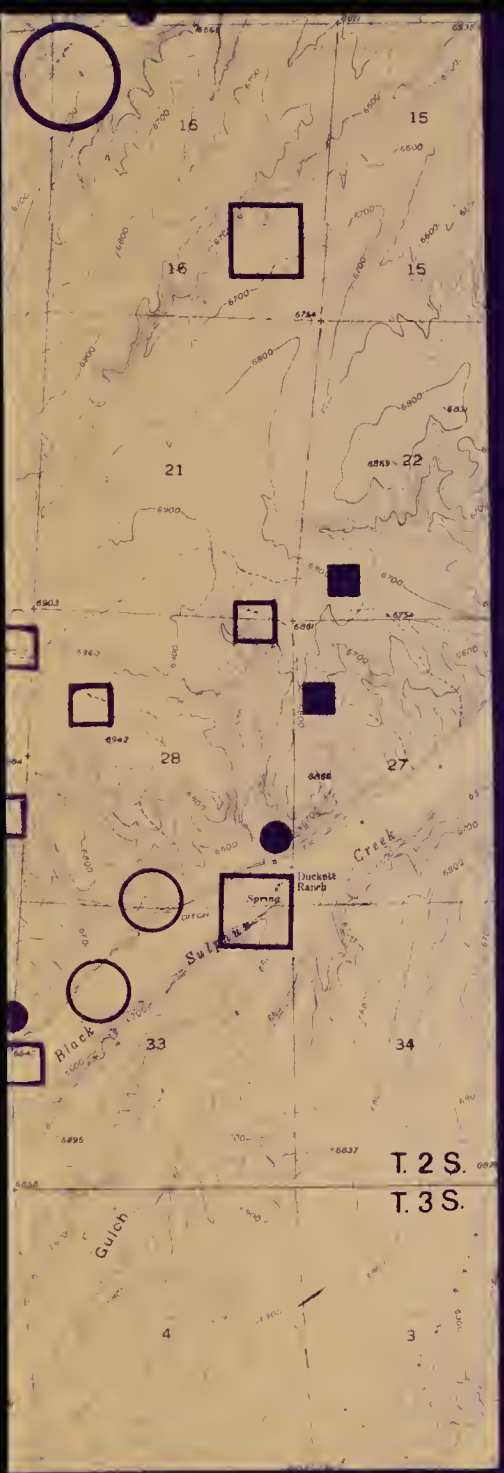
1 – 5 ■

6 – 15 □

MORE THAN 15 ▢

DECEMBER 30, 1974


Airplane Ridge
Spruce Gulch
Spruce Gulch
Prospect
PIPELINE
Spruce Gulch
Spruce Gulch
CATHEDRAL BLUFFS
Cross Gulch
Gulch
Springs
Prospects
LANDING STRIP
Right Fork Stake Springs Draw
Draw
Stake Springs
Left Fork Stake Springs Draw
Horse Pasture Canyon
Dillon
Left Fork Middle Fork
Black Cabin Point
Black Cabin Gulch
Dry Ryan Gulch
Gulch
Ryan Gulch
Galloway Gulch
Wagonroad
Gulch
Gulch
RIDGE
Swizer
Stake Spring
Ryan Gulch
Ryan Ranch
Gulch
Gulch
Gul



1 – 5

6 – 15

MORE THAN 15



0 1/2 1 2 miles

NORTH

ECI

ECOLOGY CONSULTANTS INC.
Fort Collins, Colorado

Figure 44. Location of domestic livestock observed during aerial surveys conducted on November 8 and December 30, 1974 for the Rio Blanco Oil Shale Project.

observed along Black Sulfur Creek along the road from Ryan School to 84 Ranch, and along Big Duck Creek during the survey.

The distribution map indicates that cattle are more concentrated in December than in November, although individuals or small herds are scattered throughout the study area. The cattle are concentrated in Ryan Gulch because the rancher has feeding areas located in the bottomland.

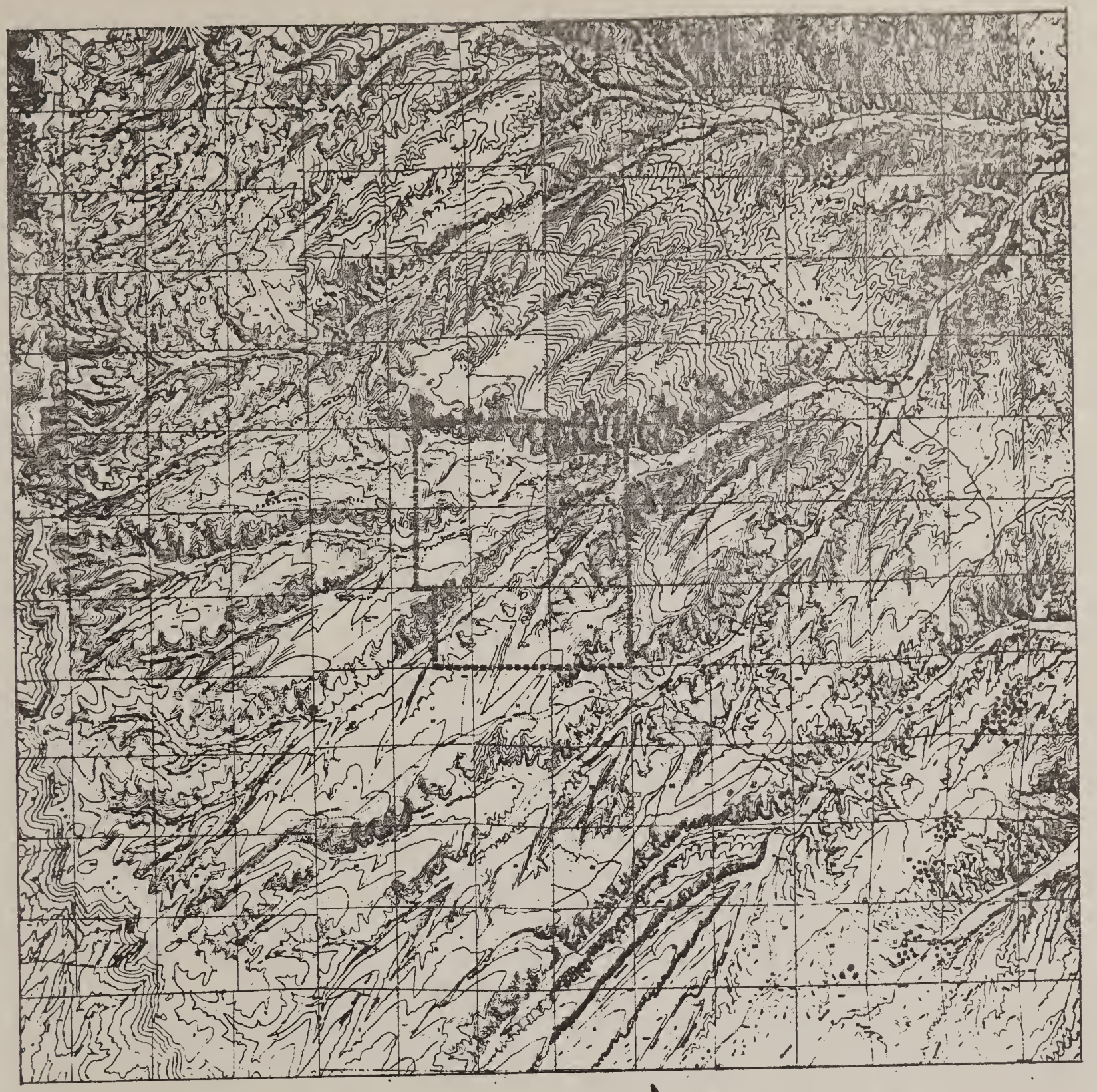
2.3.10.4. SUMMARY AND CONCLUSIONS

A total of 333 and 335 cattle were observed on the aerial surveys conducted on November 8 and December 30, respectively. Observations were widely scattered in November but the increased snow cover and limited food supply in December resulted in concentration of cattle along the bottomland in Ryan Gulch.

Domestic Livestock (14.1.7)

Distribution Records

FIELD OBSERVATIONS



Species Domestic cattle Date Nov 8, '74 Time _____

Means of Identification obs from aerial flight

Number Observed 306 ♂ _____ ♀ _____

Adult _____ Juv. _____

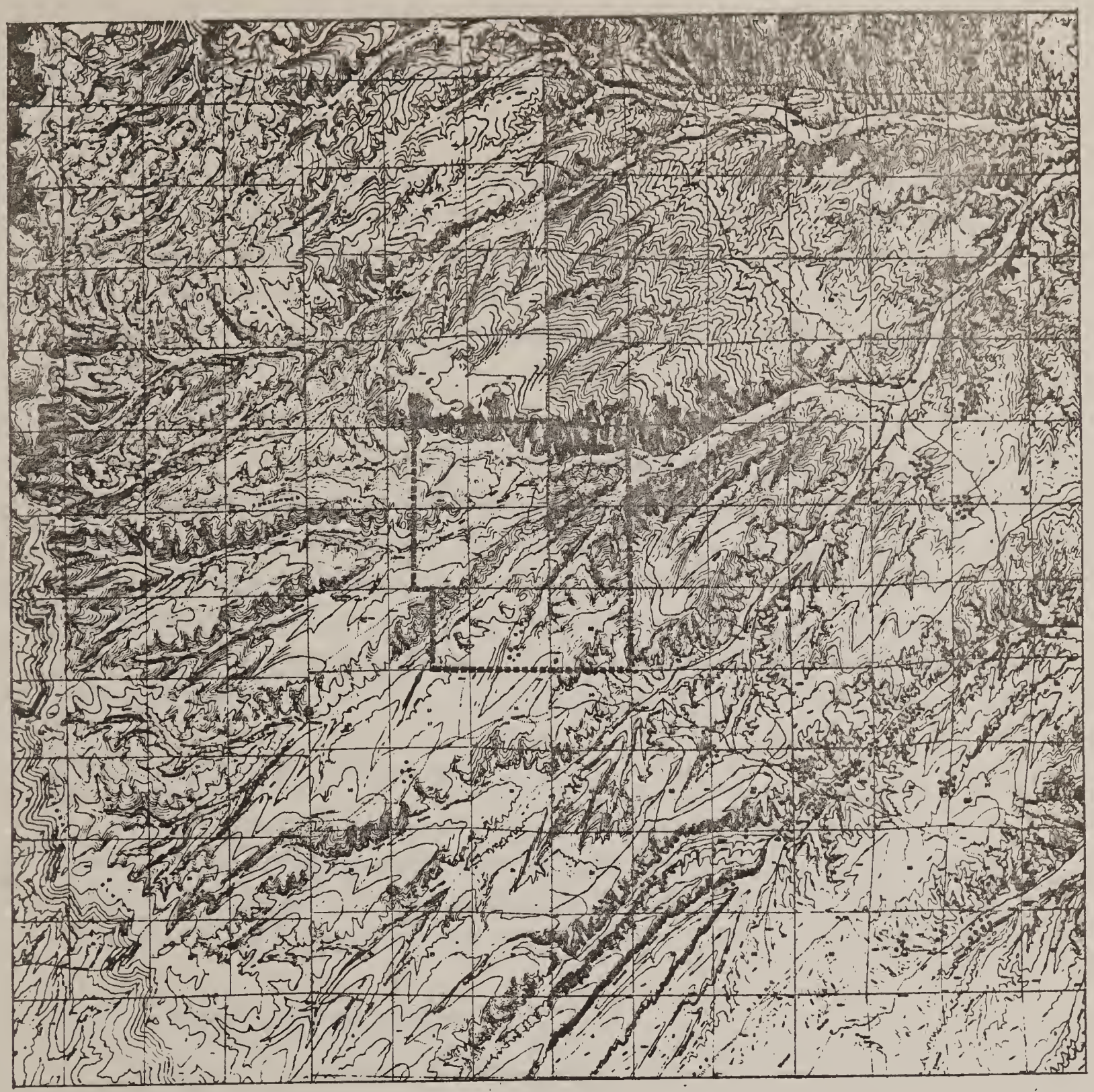
Habitat _____

Other Information* each dot represents one animal

Observer Kling, Van Horn

* Include any distinguishing field marks for horses.

FIELD OBSERVATIONS



Species domestic cattle Date 12/30/74 Time _____

Means of Identification obs. from aerial flight

Number Observed 322 ♂ _____ ♀ _____

Adult _____ Juv. _____

Habitat _____

Other Information* each dot represents one animal

Observer Kline, VanHorn

* Include any distinguishing field marks for horses.

2.3.11. THREATENED AND ENDANGERED SPECIES

2.3.11.1. INTRODUCTION

Some species of mammals, birds and plants which are designated as "threatened" (USDI Bureau of Sport Fisheries and Wildlife, 1973), "rare" or "endangered" (USDI Fish and Wildlife Service, 1974) are expected on and in the vicinity of Tract C-a. If these species are present, they will be identified and their location and reliance on tract habitats determined.

2.3.11.2. METHODS AND MATERIALS

Throughout earlier sections of this annual report, specific, quantitative sampling techniques have been described which are to be performed within all major vegetative associations of the tract to inventory and enumerate the species of plants and animals present. Cumulatively, these techniques should ascertain the presence of rare or endangered species. Once discovered, particular efforts may be given to determining the distribution and habitat utilization of the species on and near the C-a tract.

2.3.11.3. RESULTS AND DISCUSSION

To date, only one "threatened" or "endangered" animal species, the prairie falcon ("Threatened" - USDI Bureau of Sport Fisheries and Wildlife, 1973) has been observed. One individual of this species was observed on December 17, 1974 in the vicinity of 84 Ranch.

2.3.11.4. SUMMARY AND CONCLUSIONS

Only one, "threatened" or "endangered" species, the prairie falcon, has been observed to date.

2.3.12. ANIMAL DISTRIBUTION INVESTIGATIONS

2.3.12.1. INTRODUCTION

Animal distribution investigations conducted in conjunction with all field investigations are designed to provide information on the distribution of different animal species within different vegetation types on and near Tract C-a.

2.3.12.2. METHODS AND MATERIALS

Presence of animal species as indicated by capture, sightings, tracks, scats, nests, dens, food remains or other definitive signs are being recorded on scaled field maps of Tract C-a and surrounding areas whenever noted during any field work (Figure 25). Information from these field maps is transferred to individual species distribution maps and these will be supplied in the Final Report.

Hall and Kelson (1959) is the nomenclatural authority and Armstrong (1972) is the basis being employed for the most current published literature on Colorado small mammal distributions. Murie (1954) is used for identifying animal sign. Maslin (1959) is the authority ECI is using for reptile and amphibian nomenclature. The bird nomenclature being used follows the American Ornithologists' Union Checklist of North American Birds (AOU, 1957) as updated by the 32nd supplement to the checklist (AOU, 1973). Borror and Delong (1971) is the primary nomenclature reference being used for identifying invertebrates.

2.3.13. REMOTE SENSING

2.3.13.1. INTRODUCTION

Several ongoing investigations to determine the applicability of remote sensing techniques for acquisition of terrestrial baseline data are included in the Rio Blanco Oil Shale Project. These include investigations of the distribution, areal extent and density status of the vegetation community types; overwinter mule deer mortality; erosion condition and susceptibility; distribution of wildlife habitat for large and small mammals; distribution of western harvester ant colonies; locations of suspected habitat of major avifauna to include raptor species; and potential archaeological sites.

2.3.13.2. METHODS AND MATERIALS

Data Collection

Flight Procedures

Several flights are planned to acquire data specifically for determining the applicability of remote sensing techniques. All flights are for color infrared (CIR) imagery. This film and format combination provides the maximum amount of information (Laux, et al., 1974; Hoffer and Johannsen, 1969). A low level flight is planned for the spring of 1975 and 1976 at a maximum photographic scale of 1:2000. Coverage is flown in transects over Tract C-a and the area of the mule deer winter aerial surveys to the east of Tract C-a. An additional flight is planned for the fall of 1975 at a smaller scale (i.e., 1:6000). Coverage at this scale includes the entire 440 sq km (170 sq mi) study area.

Flight Requirements and Materials

The aerial mapping flights are designed to provide imagery of sufficiently high quality to obtain the maximum amount of information available. A qualified subcontractor is performing the aerial flights under the supervision of ECI personnel.

All planned flights must meet several requirements established by ECI to insure a maximum amount of information and high quality results.

Specifications require a 9" format aerial, metric camera (Zeiss RMK A 15/23, Wild Heerburgg RC-8 or equivalent); a high resolution, low distortion lens (focal length dependent upon application); flying height depending upon application; tilt error a maximum of 3°; 60% overlap and 30% sidelap for 1/6000; 60% endlap for 1/2000; flying time between 1000 and 1400 hours MDT; Wrattan No. 12 filter; 0-10% cloud cover and Kodak color infrared type 2443 film (Avery, 1968; Moffitt, 1972).

Imagery Inspection

To insure high quality results, ECI personnel inspect procured imagery when received from the aerial survey subcontractor. This is done by randomly selecting several successive images and visually checking them for proper scale, overlap, image quality, and tilt (Avery, 1968). If this inspection shows insufficient imagery the aerial survey subcontractor is required to provide new imagery to meet the requirements established by ECI.

Ground Truth Procedures

Ground truth (ground checking) pertains to information obtained by direct on-the-ground observations. Its purpose is to establish the accuracy of image analyses (National Academy of Sciences, 1970). Ground truth procedures will be developed and conducted during ECI field investigations so that special site visits will not be required. These are performed by ECI staff members knowledgeable in the area of interpretation (e.g., mammals, vegetation). Staff members conducting ground truth missions are furnished with a map showing the interpretation boundaries and/or locations, a description of the interpretation and the image, enclosed in a plastic case for protection, from which the interpretation was made. Areas for checking are visited and interpretation verified. If interpretation is incorrect a description of the area and/or location is recorded and returned to ECI remote sensing personnel for reevaluation and correction. Specific procedures for applications are defined in the later sections.

Laboratory Analyses

Analysis of the CIR transparencies is conducted using a variable intensity light table with a mounted zoom stereoscope. Interpretations are

made directly on the imagery using water soluble ink. Interpreted information is then transferred to 1:24000 mylar reproductions of USGS 7 1/2 minute topographic quadrangles.

Vegetation

Vegetation associations are identified using similar interpretation keys as used on the preliminary map on Tract C-a and surrounding area. Unknown anomalies are noted and ground truthed to verify interpretation. This is done by a written description of the major vegetation species through ground inspection and providing this information to the remote sensing personnel for classification. All roads and trails which are identified and not on USGS 7 1/2 minute topographic maps are included to provide landmarks for ground checking.

After interpretation and required ground truth checks, details are transferred to black-line, topographic mylar reproductions and scaled to 1:24000. Transfer of detail to base maps is performed using a transfer instrument which allows removal of photographic errors due to tilt and scale differences caused by variations in flying height. This allows correlation of vegetation associations with topographic relief. Color-coded and/or paratone patterns are used to facilitate recognition of the vegetation distribution throughout the study area.

Mapping. The preliminary vegetation map was prepared using color and color-infrared (CIR) positive prints. The imagery was unacceptable for high resolution mapping due to paper grain, but nonetheless provided an initial base for the preliminary map. Flights at lower altitudes and the use of transparencies provides the resolution and quality necessary for a more detailed final vegetation map.

Type Identification. Identification of vegetation types is determined on the basis of texture, tone, topographical characteristics, and size and shape on the imagery (Avery, 1968). For the preliminary vegetative cover map, detail is visually transferred to 1:12000 black-line mylar reproductions of 1:24000 topographic quadrangles. Photographic errors are reduced by overlaying the mylar on the prints and aligning geographic features.

Areal Extent. Quantification of areal extent (vegetation amplitude) is performed utilizing planimetric measurements of vegetation community types on the final map. A table is developed showing the acreage measurements of the major types prior to site development.

Density Classes (Crown Density). Density classes of the major wooded vegetative types are mapped, based on estimated crown density. Crown density is the proportion of the forest canopy occupied by trees and refers to all crowns in the stand regardless of canopy level. Estimates are ocular and stands are grouped into classes based on percentages (Avery, 1968). ECI investigations include the following density classes:

0-25% Crown Density
26-50% " "
51-75% " "
76-100% " "

Vegetation Condition. Vegetation condition and mortality rates caused by disease and insect infestations are mapped for Tract C-a and surrounding areas to supplement other documentation of conditions prior to development. ECI investigations of the dominant vegetation types on and around Tract C-a are conducted to provide information on susceptible species. Species which have a known susceptibility are selected and mapped. Appropriate areas are coded for:

- Areal measurement of total stand
- Percentage of stand affected
- Number of trees affected.

The amount of ground checking to verify interpretation is presently unknown. This depends on the amount of damaged vegetation identified on the imagery used for this analysis. Once analysis is completed a subsample is determined (1-5%) for ground checking. Branch samples are collected from the upper canopy of sampled trees and are visually analyzed to determine if damage is present.

Tree Size Distribution. Techniques have been developed by the United States Forest Service for determining tree size distribution from

photographic analyses (Avery, 1968). Presently it is uncertain if correlation tables exist for the community types and species in the Piceance Basin. If available, tests are made to determine the applicability of aerial measurements to facilitate development of size distribution classes.

Erosion Condition and Susceptibility

A current Bureau of Land Management technique exists for determination of erosion condition and susceptibility using classification schemes (Bureau of Land Management, 1971). Measurements are based on the relative amounts of bare soil and plant cover. This technique is used on Tract C-a utilizing the 1:6000 scale imagery. Parameters to be measured include:

- Percentage vegetation cover (0-100%)
- Erosion condition classes - stable, slight, moderate, critical, severe (Bureau of Land Management, 1971)
- Erosion susceptibility - slight, moderate, severe (Bureau of Land Management, 1971)

Erosion condition and susceptibility maps are produced at an approximate scale of 1:6000. If the CIR imagery cannot be used for these measurements the application will be dropped from the terrestrial baseline program.

Wildlife Habitats

Because the distribution of most wildlife is directly related to the distribution of vegetation and water, much of the vegetation information discussed previously is used to delineate the distribution of wildlife habitats. Information on distribution of species gained from a diversity of census techniques is used as the basis for maps which depict the relative habitat availability for important large and small mammals. This is done by keying wildlife species to identifiable vegetative types. Sightings of large mammals and predators from the imagery are noted and locations incorporated with other pertinent investigations. Prairie dog town locations are especially important in pinpointing potential habitats for black-footed ferrets (Mustela nigripes). Maps showing the locations and extent of interpreted locations are provided to ECI small mammal personnel for ground checking during their investigations. This requires a visit to the area(s) and visual inspection for verification.

Both the 1:6000 and 1:2000 CIR imagery are analyzed for areas of major avifauna habitat including that of raptorial species. Rock outcrops, cliffs and noted specific nesting activity is mapped on 1:24000 USGS base maps. This information is placed on maps and made available to ECI personnel conducting avifauna investigations.

Western harvester ant colonies are also mapped on USGS 1:24000 quadrangles. Density is determined by overlaying a 1 ha (2.47 A) grid scaled to the 1:6000 imagery and counting colonies. Ground checking requires site visits to the interpreted areas and visual verification.

Mule Deer Overwinter Mortality

An aerial CIR imagery technique has been jointly developed by the Colorado Division of Wildlife and the U.S. Forest Service (Gill, et al., 1972). Results compiled by the Division of Wildlife to date conclude that photo interpreter experience and type of imagery analyzed produce the greatest variance in results. Additionally, large scale (1:2000) CIR imagery flown in the spring provides more reliable data than summer flights.

The ECI flight planned for the spring of 1975 at a scale of 1:2000 provides the required information for this application. ECI remote sensing personnel have also been in contact with Mr. Richard Driscoll, U.S. Forest Service, and Mr. Bruce Gill, Colorado Department of Game, Fish and Parks, principles in the development of this technique. Examples of photo interpretation and other pertinent information available from them are used for the training of ECI personnel. This avoids inexperienced photo interpretation.

Deer mortality counts are made for 10 designated ground transects on Tract C-a and areas to the east which comprise the major deer wintering grounds. Belt transects approximately 161 m (528 ft) and 1.6 km (1 mi) long encompass 25.9 ha (64 A) with a direction of travel that crosses the maximum number of contours. The same transects are located and plotted on any subsequent imagery used for over-winter mortality count purposes. Carcass counts and age estimates are performed over the transects both by ground census and photo interpretation. All deer carcass locations are plotted on USGS base maps to illustrate areas of maximum mortality. Two interpreters will inspect

the imagery to determine which interpreter provides the best results. Correlations with ground censuses are made to determine the relative accuracy of the aerial census technique. If a sufficient accuracy exists between the two, a correction factor will be applied to the CIR imagery technique. Further imagery analysis is then conducted for the remaining imagery covering Tract C-a and the area to the east. If the CIR imagery technique proves inadequate the application is dropped.

It is presently unknown what accuracy is required for utilizing the CIR imagery technique. This is dependent upon the number of carcasses located in the 10 transect sample from which accuracy can be established. At present, an accuracy of 70% has been tentatively considered adequate for this application. Further analyses and testing may require further refinement for this application.

Archaeological Sites

Detection of archaeological sites through imagery analysis depends on several factors including whether a nomadic or sedentary lifestyle existed in the Piceance Basin. The 1:6000 imagery is analyzed for signs which may indicate past disturbance and suspect areas are plotted on topographic maps. These maps are then sent to the archaeological consultant for further analysis. Interpretation keys to consider in locating potential sites include:

- Vegetation changes (abrupt, unnatural)
- Building remnants (indicating historical significance)
- Irrigation ditches (vegetation overgrowth or linear patterns)
- Disturbance (old fence lines, linear or circular edge patterns).

If locations of archaeological sites by film analysis proves impractical this application is dropped.

The initial flight to obtain color infrared (CIR) imagery will be conducted in the spring, 1975. Some of the results of the subsequent imagery analysis may be available for the Second Quarterly Report.

2.3.14. LITERATURE CITED

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